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# THE ENGINEERING INDEX ANNUAL-1917

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# THE
# ENGINEERING INDEX
## ANNUAL
FOR
## 1917

COMPILED FROM THE ENGINEERING INDEX PUBLISHED MONTHLY
IN INDUSTRIAL MANAGEMENT DURING 1917.

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# TO THE USER

WITH this volume of The Engineering Index—the sixteenth since the work was first undertaken and the twelfth since it assumed the "Annual" form—a continuous index to the engineering and technical literature of the past thirty-four years is made available to the reader. And in this book, as in the Annual volumes previously issued, the "classified" system of arranging the items is followed in place of the "strict alphabetic" order of the earlier volumes. In other words, the articles indexed are first grouped under the great divisions of engineering practice to which they belong—Civil, Mechanical, Electrical, Mining, etc.—and under these again they are sub-grouped according to the recognized special divisions of each field. After these two steps have been taken in sorting the miscellaneous literature of the day into closely related sections, the final arrangement under each section becomes strictly alphabetical.

In The Engineering Index Annual for 1917, herewith presented, the Classification of the Index on page 7 not only gives the main and sub-heads of the classified arrangement, but lists in addition every catch-word, with its page reference, so that a full outline of the entire contents is given in a highly condensed form, and by running his eyes over this topical list the reader may save much of the time that might be spent searching the pages of the book itself.

Serial articles are indexed upon the appearance of the first installment only, thus giving the searcher the clue by which the succeeding articles can be found. This rule has been waived in some instances of articles in two or three installments, which are indexed entire.

The Index comprises about two hundred and fifty publications, representing seventeen nations and colonies and six languages. About three-fourths of these journals are printed in English, the others being in French, Spanish, Italian and Dutch. With every entry a brief descriptive note is given defining the scope and purport of the articles, in many cases sufficient for the purpose of the investigator and saving him the labor of further search. In general, however, the Index is used as a guide to the otherwise overwhelming mass of information contained in the huge files of the engineering periodicals stacked on the shelves of reference libraries throughout the world.

The work as a whole represents the continuation of that originally started by the late Professor J. B. Johnson in the journal of the Association of Engineering Societies in 1884, and turned over by that association to The Engineering Magazine at the close of 1895. The successive volumes, published in 1892, 1896, 1901, 1906, 1907, 1908, 1909, 1910, 1911, 1912, 1913, 1914, 1915 and 1916, respectively, covered with increasing fulness and thoroughness the field of periodical literature in engineering and closely related applied sciences. This new volume brings the investigator down to the December, 1917, monthly part of The Engineering Index, covering the serial literature of engineering up to October, 1917, while the earlier parts enable searches such as occur in patent cases and the like to be prosecuted with a minimum of cost and delay.

# REFERENCE LIST OF PERIODICALS

## Alphabetical List of Periodicals Indexed in Order of Their Abbreviations

| Abbreviation | Title | Issues per Year | Place of Publication |
|---|---|---|---|
| A A | Aerial Age Weekly | 52 | New York |
| A & B | Architecture & Building | 12 | New York |
| A A P C M | Assn. Amer. Portland Cement Mfrs. | Irreg. | Philadelphia |
| A cr | Autocar | 52 | London |
| Ae | Aera | 12 | New York |
| A El S | American Electrochemical Society | Irreg. | So. Bethlehem |
| A E R | American Economic Review | 12 | Princeton |
| A E R A | American Electric Railway Association | 12 | New York |
| Aern | Aeronautics | 52 | London |
| A E S | Assn. Engineering Societies | 12 | St. Louis |
| A F A | Amer. Foundrymen's Assn. | Irreg. | Cleveland |
| A I & S I | Amer. Iron & Steel Institute | 12 | New York |
| A I C E | Amer. Institute of Chemical Engineers | Irreg. | New York |
| A I E E | Amer. Institute of Elec. Engineers | 12 | New York |
| A I M E | Amer. Institute of Mining Engineers | 12 | New York |
| A I Mt | Amer. Institute of Metals | Irreg. | Buffalo |
| A I S E E | Assn. Iron & Steel Elec. Engrs. | 1 | Pittsburgh |
| A Jl P H | Amer. Journal of Public Health | 12 | Boston |
| A Jl S | Amer. Journal of Science | 12 | New Haven |
| Am Mach | American Machinist | 52 | New York |
| A M S | Australian Mining Standard | 52 | Sydney |
| A R | Architectural Record | 12 | New York |
| A R B A | Amer. Road Builders' Assn. | Irreg. | New York |
| A R B & B A | Amer. Ry. Bridge & Bldg. Assn. | Irreg. | Chicago |
| A R E A | Amer. Ry. Engineering Assn. | 10 | Chicago |
| A R M M A | Amer. Ry. Mas. Mech. Assn | 1 | Chicago |
| A S | Applied Science | 12 | Toronto |
| A S C E | Amer. Soc. of Civil Engineers | 10 | New York |
| A S H V E | Amer. Soc. of Heat. & Vent. Engineers | 4 | New York |
| A S M D | Amer. Soc. of Marine Draftsmen | 4 | Washington |
| A S M E | Amer. Soc. of Mechanical Engineers | 12 | New York |
| A S N E | Amer. Soc. of Naval Engineers | 4 | Washington |
| A S R E | Amer. Soc. of Refrig. Engrs. | 6 | New York |
| A S T M | Amer. Soc. Testing Materials | 1 | Philadelphia |
| A T C A O | Assn. of Trans. & Car Acct. Officers | 2 | New York |
| Aut | Automobile | 52 | New York |
| A W P A | Amer. Wood Preserv. Assn. | Irreg. | Baltimore |
| A W W A | Amer. Water Works Assn. | 4 | Baltimore |
| B C Bul | Barge Canal Bulletin | 12 | Albany |
| B C B M | British Columbia Bureau Mines | Irreg. | Victoria |
| B E C | Brooklyn Engineers' Club | 1 | Brooklyn |
| B F & S P | Blast Furnace & Steel Plant | 12 | Pittsburgh |
| Bkbld | Brickbuilder | 12 | Boston |
| B M | Boiler Maker | 52 | New York |
| B P | Boletin de Petroleo | 12 | Mexico |
| B R & S | Better Roads & Streets | 12 | Jamestown, O. |
| B S C E | Boston Soc. of Civil Engineers | 10 | Boston |
| Bul Taylor Soc | Bulletin of the Taylor Society | 4 | Hanover, N. H. |
| B W | Brass World & Platers' Guide | 12 | New York |
| C A M | Compressed Air Magazine | 12 | New York |
| C C E | Cornell Civil Engineer | 8 | Ithaca |
| C D M | Canada Department of Mines | Irreg. | Ottawa |
| C E M | Cassier's Engineering Monthly | 12 | London |
| C E S St P | Civil Engineers' Soc., St. Paul | 1 | St. Paul |
| C G | Colliery Guardian | 52 | London |
| C I A At | Atti. Colleg. Ingegneri ed Arch. | 12 | Milan |
| Cl A | Coal Age | 52 | New York |

| ABBREVIATION | TITLE | ISSUES PER YEAR | PLACE OF PUBLICATION |
|---|---|---|---|
| C M I | Canadian Mining Institute | 12 | Montreal |
| C M Jl | Canadian Mining Journal | 24 | Toronto |
| C M M S S A | Chem. Met. & Min. Soc. of South Africa | 12 | Johannesburg |
| C M W A | Chamber of Mines of West Australia | 12 | Kalgoorie |
| Cn E | Canadian Engineer | 52 | Toronto |
| Cnr | Contractor | 24 | Chicago |
| Cnt | Contracting | 12 | New York |
| C R C | Central Railway Club | 6 | New York |
| Crt | Concrete | 12 | Detroit |
| C S C E | Canadian Soc. of Civil Engineers | Irreg. | Montreal |
| C S M M | Colorado School of Mines Magazine | 12 | Golden |
| C U Q | Columbia University Quarterly | 4 | New York |
| C V | Commercial Vehicle | 24 | New York |
| Cw E | Commonwealth Engineer | 12 | Melbourne |
| D W P B | Dominion Water Power Branch, Dept. Int. | Irreg. | Ottawa |
| E & C | Engineering & Contracting | 52 | Chicago |
| E & M J | Engineering & Mining Journal | 52 | New York |
| E C D | Engineers' Club of Dayton | Irreg. | Dayton |
| E C P | Engineers' Club of Philadelphia | 4 | Philadelphia |
| E C St L | Engineers' Club of St. Louis | 6 | St. Louis |
| E G | Economic Geology | 8 | New Haven |
| El A | Electrical Age | 12 | New York |
| El Jl | Electric Journal | 12 | Pittsburgh |
| Eln | Electrician | 52 | London |
| El R | Electrical Review | 52 | London |
| El R & W E | Electrical Review & West. Electrician | 52 | Chicago |
| El R Jl | Electric Railway Journal | 52 | New York |
| El T | Electric Traction | 12 | Chicago |
| El W | Electrical World | 52 | New York |
| Eng | Engineering | 52 | London |
| Eng News-Rec | Engineering News-Record | 52 | New York |
| Enr | Engineer | 52 | London |
| E S P | Engineers' Soc. of Pennsylvania | 12 | Harrisburg |
| E S W P | Engineers' Soc. of West. Pennsylvania | 10 | Pittsburgh |
| F I Jl | Franklin Institute Journal | 12 | Philadelphia |
| Fly | Flying | 12 | New York |
| Fnd | Foundry | 12 | Cleveland |
| G E R | General Electric Review | 12 | Schenectady |
| Gn Cv | Génie Civil | 52 | Paris |
| G R | Good Roads | 12 | New York |
| H A | Horseless Age | 24 | New York |
| H & V M | Heating & Ventilating Magazine | 12 | New York |
| I A | Iron Age | 52 | New York |
| I & C T R | Iron & Coal Trades Review | 52 | London |
| I & R | Ice & Refrigeration | 12 | Chicago |
| I C E I | Institution Civil. Engineers of Ireland | 1 | Dublin |
| I C E | Institution of Civil Engineers | Irreg. | London |
| I E E | Institution of Electrical Engineers | Irreg. | London |
| I E S S | Instn. Engrs. & Shpbldrs. of Scotland | Irreg. | Glasgow |
| I F | L'Ingegneria Ferroviaria | 24 | Rome |
| I I Bul | Bulletin of the Imperial Institute | 4 | London |
| I Mch E | Institution of Mechanical Engineers | Irreg. | London |
| I M E | Institution of Mining Engineers | Irreg. | London |
| I M M | Institution of Mining & Metallurgy | Irreg. | London |
| I Mr E | International Marine Engineering | 12 | New York |
| Ind | L'Industria | 52 | Milan |
| Ind Man | Industrial Management | 12 | New York |
| Ing | Ingenieur | 52 | The Hague |
| Inst Aut Engrs | Institute Automobile Engineers | 12 | New York |
| I S C A M A | Iowa State Col. & Agri. & Mech. Arts | 4 | Ames |
| I S E | Institute of Sanitary Engineers | 12 | London |
| I T R | Iron Trade Review | 52 | Cleveland |
| Jl Act | Journal of Accountancy | 12 | New York |

| ABBREVIATION | TITLE | ISSUES PER YEAR | PLACE OF PUBLICATION |
|---|---|---|---|
| Jl G | Journal of Geology | 8 | Chicago |
| Jl Ind & Eng Chem | Journal of Industrial and Engineering Chemistry | 12 | New York |
| K A E | Keighly Assn. of Engineers | Irreg. | Keighly |
| La Nt | La Nature | 52 | Paris |
| L S M I | Lake Superior Mining Institute | 1 | Superior |
| M A E | Manchester Assn. of Engineers | Irreg. | Manchester |
| M & C E | Metallurgical & Chemical Engineering | 24 | New York |
| M & E R | Mining & Engineering Review | 12 | Melbourne |
| M & E W | Mining & Engineering World | 52 | Chicago |
| M & S P | Mining & Scientific Press | 52 | San Francisco |
| M B M A | Master Boiler Makers' Assn. | 1 | New York |
| Mch | Machinery | 12 | New York |
| Mch E | Mechanical Engineer | 52 | Manchester |
| Mch W | Mechanical World | 52 | Manchester |
| M E & N A | Marine Engineer & Naval Architect | 12 | London |
| M I | Metal Industry | 12 | New York |
| M Jl | Mining Journal | 52 | London |
| M Mg | Mining Magazine | 12 | London |
| M M S A | Mining & Metallurgical Soc. of Amer. | 12 | New York |
| Mfrs Rec | Manufacturers' Record | 52 | Baltimore |
| M Rv | Marine Review | 12 | Cleveland |
| Min & Sci Pr | Mining & Scientific Press | 52 | San Francisco |
| Mon Tec | Monitore Tecnico | 36 | Milan |
| Mun E | Municipal Engineering | 12 | Indianapolis |
| Mun Engrs Jl | Municipal Engineers' Journal | 12 | New York |
| Naut Gaz | Nautical Gazette | 52 | New York |
| N E | National Engineer | 12 | Chicago |
| N E C I E S | N-E Coast Instn. Engrs. & Shpbldrs. | Irreg. | New Castle |
| N E W W A | New England Water Works Assn. | 4 | Boston |
| N F A Sf Bul | National Founders' Assn. Saf. Bulletin | 12 | West Lynn |
| N L M A | National Lime Manufacturers' Assn. | Irreg. | |
| Nt | Nature | 52 | London |
| N Y R C | New York Railroad Club | 9 | New York |
| O S M E S E | Ohio Soc. Mech., Elec. & Steam Engrs. | 2 | Columbus |
| P B S | Philippine Bureau of Science | Irreg. | Manila |
| P C An | Annales des Ponts et Chaussées | 6 | Paris |
| P E, C | Practical Engineer, Chicago | 24 | Chicago |
| P Jl S | Philippine Journal of Science | 6 | Manila |
| P W I | Permanent-Way Institution | 4 | Beeston |
| Pwr | Power | 52 | New York |
| Q G M Jl | Queensland Government Mining Journal | 12 | Brisbane |
| Qry | Quarry | 12 | London |
| R A G | Railway Age Gazette | 52 | New York |
| R & L E | Railway & Locomotive Engineering | 12 | New York |
| R C P | Railway Club of Pittsburgh | 9 | Pittsburgh |
| R E | Railway Engineer | 12 | London |
| R E & M W | Railway Engineering & Maint. of Way | 12 | Chicago |
| R G | Railway Gazette | 52 | London |
| R G S | Revue generale des Sciences | 24 | Paris |
| R M | Rivista Marittima | 12 | Rome |
| R M E | Railway Mechanical Engineer | 12 | New York |
| R M M | Railway Master Mechanic | 12 | New York |
| R R | Railway Review | 52 | Chicago |
| R S A | Royal Society of Arts | 52 | London |
| R S E | Railway Signal Engineer | 12 | Chicago |
| R T | Resources of Tennessee | 4 | Nashville |
| R T C | Revue Trimestrielle Canadienne | 4 | Montreal |
| R U S I | Royal United Service Institution | 4 | London |
| S A E | Society of Automobile Engineers | 12 | New York |
| S & I | Steel and Iron | 12 | Pittsburgh |
| S & S-W R C | Southern & Southwestern Railway Club | 6 | Atlanta |
| S B | Schweizerische Bauzeitung | 52 | Zurich |

| ABBREVIATION | TITLE | ISSUES PER YEAR | PLACE OF PUBLICATION |
|---|---|---|---|
| S E | Society of Engineers | 12 | London |
| S C A An | Anales de la Soc. Cientif. Argentina | 6 | Buenos Aires |
| S C I Rv | Revista, Soc. Cubana de Ingenieros | 12 | Havana |
| S E I N | Societe d'Encourag., Indus. Nation. | 12 | Paris |
| Sf E | Safety Engineering | 12 | New York |
| S I | Stevens Indicator | 4 | Hoboken |
| S I A I An | Annali, Soc., Ingeg. e Archit. Ital. | 24 | Rome |
| S I C F | Societe Ingenieurs Civils de France | Irreg. | Paris |
| S I E | Societe Internation. Electriciens | Irreg. | Paris |
| S Jl E | Sibley Journal of Engineering | 9 | Ithaca |
| S L R C | St. Louis Railway Club | 12 | St. Louis |
| S M | Scientific Monthly | 12 | New York |
| S M C E | Surveyor & Municip. & County Engr. | 52 | London |
| S M Q | School of Mines Quarterly | 4 | New York |
| S N A M E | Soc. Naval Arch. & Mar. Engineers | Irreg. | New York |
| S P S M | Soc. to Promote Sci. of Management | 6 | Hanover |
| S R & M E | Sanitary Rec. & Municip. Engineer | 52 | London |
| T & R W | Tramway & Railway World | 12 | London |
| T E | Telephone Engineer | 12 | Chicago |
| T E A | Traveling Engineers' Assn. | Irreg. | East Buffalo |
| Times Engng Supp | Times Engineering Supplement | 12 | London |
| Tly | Telephony | 52 | Chicago |
| T S | Travelers Standard | 12 | Hartford |
| U E E S | Utah Engineering Experiment Station | Irreg. | Salt Lake City |
| U I | University of Illinois | Irreg. | Urbana |
| U M | University of Minnesota | Irreg | Minneapolis |
| U M S M M | Univ. of Mo. School of Min. & Metall. | 4 | Rolla |
| U N P | Universidad Nacional de la Plata | Irreg | La Plata |
| U S B M | U. S. Bureau of Mines | Irreg | Washington |
| U S B S | U. S. Bureau of Standards | Irreg | Washington |
| U S C & G S | U. S. Coast & Geodetic Survey | Irreg | Washington |
| U S D A | U. S. Dept. of Agriculture | Irreg | Washington |
| U S G S | U. S. Geological Survey | Irreg | Washington |
| U S N I | U. S. Naval Institute | 6 | Annapolis |
| W E | Western Engineering | 12 | San Francisco |
| W G N H S | Wis. Geol. & Nat. Hist. Surv. | Irreg | Madison |
| Wis E | Wisconsin Engineer | 9 | Madison |
| W P I Jl | Jour. Worcester Polytech. Institute | 6 | Worcester |
| W R C | Western Railway Club | 9 | Chicago |
| W S E | Western Soc. of Engineers | 10 | Chicago |

# ORIGINAL ARTICLES SUPPLIED

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# CLASSIFICATION OF THE INDEX

*TO THE USER: This classification should always be consulted, and the page number of the proper division ascertained, before looking for an item in the body of the book.*

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**Arches**

New Formula for the Crown Thickness of Arches (74511). Joseph P. Schwada. Ills. 1900 w. Eng News—Nov. 9, 1916. Diagrams for various kinds of bridges under different conditions of design and location.

Concrete Arch Bridge, Lawrence, Mass. (76749). Ills. 1500 w. Contg—Feb., 1917. Thirteen reinforced concrete arches. Construction methods.

Erection of 592 ft. Arch Span Topock Bridge (76750). Ills. 1500 w. Contg—Feb., 1917. Erection methods.

The Design of Symmetrical Hingeless Concrete Arches (77465 B). Ills. 29 pp. Engrs' Soc W Penn—Jan., 1917. Synopsis and discussion of Victor H. Cochrane's paper.

New Bridge Over the Schuylkill at Manayunk (78355). Ills. 1100 w. Ry Age Gaz—Apr. 27, 1917. Arch structure on Pennsylvania Railroad.

Il Ponte A Tre Cerniere Sul Fiume Noce E Le Cerniere Mesnager (78851 C). T. Bianchi. Ills. 1500 w. Soc Ing Arch Ital—Apr. 1, 1917. Reinforced concrete arch of 99 ft. span, over an Italian mountain stream.

Three-Hinged Arch Highway Bridge Built of Timber (79364). F. W. Haselwood. Ills. 1500 w. Eng News-Rec—June 21, 1917. Redwood the most economical material at remote site. Arches erected by overhead cables.

**Arthur Kill**

Difficult Problems Solved in Placing New Members and Larger Pins in Drawspan (75056). Ills. 1200 w. Eng Rec—Dec. 2, 1916. Methods of repairing Arthur Kill bridge.

**Bascule**

Bascule Bridge for Highway Service in California (74828). Ills. 1200 w. Eng Rec—Nov. 25, 1916. Sacramento River.

Ponts Basculants (75590 B). Ills. 2200 w. Gen Civ—Dec. 2, 1916. The Scherzer and Cuvelier systems exemplified and compared.

New Bascule Bridge at Deering Station, Chicago (75837 A). Ills. 3000 w. Ry & Loco Eng—Jan., 1917. Erection with minimum interruption.

Puente Del Rio Ozama (79406 A). O. A. Aceredo. Ills. 2600 w. Soc Cub Ing Rev—May, 1917. New bascule bridge, Strauss type, recently built across the Ozama River, in Santo Domingo.

Bascule Bridge Across Cataragin River (79770). R. K. Palmer. Ills. 1500 w. Can Engr—July 5, 1917. Details of construction and method of operation of bridge at Kingston, Ont.

Bascule Bridge at Syracuse Typical of New York Canal Crossings (79602). Arthur G. Hayden. Ills. 1000 w. Eng News-Rec—June 28, 1917. Skew of 28° led to using fixed floor over counterweight pit.

Bascule Bridge is Erected as a Cantilever (80181). W. J. Howard. Ills. 800 w. Eng News-Rec—July 26, 1917. Double-leaf Market St. structure at Chattanooga places by means of traveler mounted on deck of span.

**Bridge Paving**

Modern Heavy Traffic Destroys East River Bridge Paving (78600). Ills. 1500 w. Eng News-Rec—May 10, 1917. From paper by Edward A. Byrne. Floor systems of four East River bridges need rebuilding.

**Caissons**

Timber-Incased Concrete Caisson to Be Sunk 142 Feet for New London Bridge (75373). Ills. 2500 w. Eng Rec—Dec. 16, 1916. Design gives greater strength than all timber and greater flexibility than all concrete.

Bridge Caissons Sunk in River Where Tide Varies 33 Feet, Creating 15-Mile an Hour Current (78084). C. H. Hollingsworth. Ills. 4000 w. Eng News-Rec—April 12, 1917. Construction at Moncton, N. B.

**Caisson Work**

Pneumatic Caisson Work on the Petitcodiac River Bridge Piers (77051). E. M. Archibald. Read before Can. So. Civ. Engrs. 3000 w. Can Engr—March 1, 1917. Serial, 1st part. Methods of constructing unusual foundations.

**Cantilevers**

Arcaded Cantilevers Cased in Concrete Feature a Million-Dollar Bridge (77687). Ills. 2500 w. Eng News—March 29, 1917. Hanover St. bridge in Baltimore.

Cantilever Highway Bridge Over the Mississippi (77535). Ills. 1800 w. Eng News—March 22, 1917. Details of superstructure of steel bridge at Burlington, Iowa.

**Causeway**

Arch Design Adopted for Galveston Causeway Reconstruction (75779). Ills. 2000 w. Eng Rec—Jan. 6, 1917. Arch and continuous girder plans compared. Reasons for favoring arch design.

**Charing-Cross**

Charing-Cross Bridge (80737). 1000 w. Times Eng Supp—July 27, 1917. An old bridge strengthened. Plans for reconstruction to meet demands of modern rolling stock.

**Collapse**

Report on Collapse of Falsework on Spokane Concrete Bridge (76825). John C. Ralston. Ills. 1500 w. Eng News—Feb. 22, 1917. Details of flimsy falsework design under arch which failed during construction.

**Concrete**

Building a Girder Concrete Bridge (74441 A). Daniel J. Hauer. Ills. 1200 w. Contr—Nov. 1, 1916. Wrecking old structure; excavation and methods.

Ferro-Concrete Bridges on the Meuse (75226 A). Ills. 1500 w. Surv'r—Nov. 24, 1916. Describes three bridges.

Lake Quinsigamond Bridge (75144). Ellis H. Custer. Ills. 1000 w. Mun Jl—Dec. 7, 1916. Construction methods on a ribbed-arch, spandrel-column concrete bridge, at Worcester, Mass.

Ten-Span Concrete-Arch Bridge Near Columbus, Ohio (75322). E. P. Knollman. Ills. 2100 w. Eng News—Dec. 14, 1916. Design and erection of Agler Bridge, across Alum Creek.

Coppermill Bridge at Wraysbury (77420 A). R. N. Stroyer. Ills. 700 w. Engr—March 2, 1917. Ferro-concrete three-span arch over the river Colne.

**Concrete Arch**

Design and Construction Details of a Long Concrete Arch Bridge (77206). C. D. Hale. Ills. 1800 w. Eng News—March 8, 1917. Methods of erection of a bridge across Rock River, Ill.

Brücke in Armiertem Beton über die Glatt in Dübendorf (77550 B). Ills. 1500 w. Schweiz Bau—Feb. 3, 1917. Reinforced concrete arch of 47-ft. span.

Construction of Two Concrete Arch Bridges at Rosalia, Wash. (74582). J. F. Pinson. Ills. 1200 w. Ry Rev—Nov. 11, 1916. From report to Am. Ry. Bridge & Bldg. Assn. on efficient methods of handling work.

Ferro-Concrete Bridges in the Twrch Valley, Glamorganshire (74563 A). Ills. 1200 w. Surv'r—Oct. 27, 1916. Four structures in South Wales.

Concrete Arch Bridge for Railway Crosses River on Reverse Curve (78910). Ills. 600 w. Eng News-Rec—May 24, 1917. Complicated construction of reinforced-concrete arch bridge at Manayunk, Penn., where the Pennsylvania R. R. cross the Schuylkill river. Unusual design adopted.

**Construction**

Tendencies in Bridge Construction (79228). Ills. 2500 w. Eng News-Rec—June 14, 1917. An interview. Talks of increase in loading, simplification of trusses, carbon steel, floors, etc.

**Culverts**

Covered Concrete Channel for Creek at Steel Plant (79748). Ills. 1500 w. Eng News-Rec—July 5, 1917. Details of construction.

The Law in Regard to the Culverting of Streams (81706 A). 2500 w. Surv'r—Sept. 7, 1917. Decision of the House of Lords on July 23, 1917. Responsibility for flooding.

**Design**

Graphics in Bridge and Beam Design (80446 B). H. S. Jacoby. Ills. 11 pp.

Corn C E—June, 1917. Advance publication. Deflection influence lines; deflection of cantilever girder, etc.

Design of Notable Bridges (76021 A). Charles Evan Fowler. 2000 w. Ore Soc Engrs, Jl—Nov., 1916. Long spans; artistic design; and related topics.

Étude Sur Un Nouveau Système De Pont Suspendu Rigide (76247 B). G. L. Le Cocq. Ills. 4000 w. Gen Civ—Jan. 6, 1917. Serial, 1st part. A new design of double arc suspension bridge. Details and stress calculations.

Some Interesting Examples of European Concrete Bridge Designs (75663). Albert M. Wolf. Ills. 800 w. Eng & Con—Dec. 27, 1916. Artistic designs.

Appearance Governs Design of Park Avenue Bridge, Cincinnati (76511). J. R. Biedinger. Ills. 1200 w. Eng Rec—Feb 3, 1917. Massive abutments of cellular type support heavy piers.

Economics of Bridge Design (81456). From a lecture by J. A. L. Waddell before the Sch. of Engng., Univ. of Kansas. 6000 w. Eng & Con—Sept. 26, 1917.

Verbindungs-Steg für Eglisau (76220 B). Ills. 1600 w. W. Schweiz Bau—Dec. 23, 1916. Competitive designs for bridge across the Rhine at Eglisau, Switzerland.

Graphics in Bridge Design (79350 A). H. S. Jacoby. Ills. 10 pp. Corn C E—May, 1917. Articles from 4th edition of "Roofs and Bridges," Part II., soon to be published.

The Design of Steel Spans, 40 Feet and Up (79802). Charles D. Snead. Ills. 2500 w. Br Rds & Sts—July, 1917. Points of interest and importance.

**Drainage Ditches**

Bridging Drainage Ditches (80526 A). C. E. Nagel. Ills. 700 w. Af Eng Soc of Minn, Bul—Aug., 1917. Types and their construction.

**Drawbridge**

The New Burlington Bridge at Kansas City (79105). Ills. 3000 w. Ry Age Gaz—June 8, 1917. Double deck spans replace the old Hannibal structure completed in 1869.

**Electric Power**

Electric Power for Operating Bridges (77723). Ills. 1800 w. Elec Rv & Wes Elec—March 31, 1917. Installations and methods. Dependability, etc.

**Erection**

Novel Method of Erection Adopted in Raising Longest Highway Arch Span (74533). Ills. 1800 w. Eng Rec—Nov. 11, 1916. Bridge on Colorado River at Topeka, Ariz., assembled in horizontal position and raised by tackle from central tower.

Methods and Cost of Erecting the St. Paul, Neb., State Aid Bridge (76982). George K. Leonard. Ills. 1000 w. Eng & Con—Feb. 28, 1917. Details.

**Flooring**

A Flooring for Bridges and Viaducts (74665). A. W. Olson. 1000 w. Mun Jl Nov. 16, 1916. Asphalt concrete surfaces used in Pueblo.

**Floors**

Stiffened Floor Insures Smooth Pavement on Queensboro Bridge (76760). Ills. 1400 w. Eng Rec—Feb. 17, 1917. Depressions in wood block were caused by deflections of buckle-plate supports and bearing.

Loadings and Floors of Highway Bridges (77864). Walter R. Marden. Ills. 2500 w. Br Rds & Sts—April, 1917. Development of bridge floor construction.

Small Clearance Under Steel Bridge Calls for Shallow Floor (77857). Jonathan Jones. Ills. 1800 w. Eng News-Rec—April 5, 1917. Cambria Street structure in Philadelphia.

Standard Bridge Floors of Concrete Slabs on Steel Beams (79869). William Snaith. 1500 w. Eng News-Rec—July 12, 1917. Weights, bending moments and costs computed.

**Foundations**

Deep Foundations of Metropolis Bridge; Built Under 51 Lb. of Air (77534). W. McCready. Ills. 2500 w. Eng News—March 22, 1917. Unusual foundation work on Ohio River bridge.

**France**

Le Pont De Chambilly, Sur La Loire (77603 C + D). M. Labadie. Ills. 4100 w. Pont Chaus Ann—Sep.-Oct., 1916. New masonry arch bridge to be built over the Loire.

**Great Bridges**

Relative Aspects of the World's Great Bridges (77925 N). H. B. Williams. Ills. 2000 w. Comwh Engr—March, 1917. Serial, 1st part. Deals with their length, height and great spans.

**Harrisburg**

Rebuilding the Susquehanna River Bridge at Harrisburg (75991). Ills. 2000 w. Contg—Jan., 1917. Replacing a single-track truss bridge under traffic by a double-track concrete-arch structure on same piers.

**Hell Gate**

The Hell Gate Arch Bridge and Approaches of the New York Connecting Railroad Over the East River in New York City (81993 D). O. H. Ammann. Ills. 153 pp. A S C E, Pro—Oct., 1917. Account of the design and construction of the greatest arch bridge built to date.

See also Hell Gate under RAILWAY ENGINEERING, *Permanent Way and Buildings.*

**High Bridge**

Proposed Reconstruction of High Bridge (77525 B). Charles E. Gregory and Eugene W. Stern. Ills. 1800 w. Mun Engrs Jl—March, 1917. Discussion.

**High-Level**

Proposes to Build High-Level Bridge Over Hudson Ten Miles South of Albany (76867). Maps. 1800 w. Eng Rec—Feb. 24, 1917. Part of plans of N Y Central's connecting railroad.

**Highway**

Highway Bridge Practice (76019 A). Henry M. Morse. 1200 w. Ore Soc Engrs, Jl—Nov., 1916. Need of raising the standard. Legislation needed.

Highway Bridges in Ontario (77837). George Hogarth. Ills. 2000 w. Can Engr—April 5, 1917. Design and methods of construction.

**Improvements**

Bridge Spans Moved Endwise to Rest on New Piers (81980). Ills. 1500 w. Eng News-Rec—Oct. 25, 1917. Increased length of new Union Pacific drawspan at St. Joseph, Mo., necessitated shifting fixed spans 140 feet.

**Java**

De Montage van de brug over de Serajoe-rivier in de lijn der Staatsspoorwegen op Java (76942 B). J. H. A. Haarman. Ills. 2800 w. Ingr—Jan. 27, 1917. Rapid construction of bridge on State Railway of Java over Serajoe river. Rapid construction under difficulties.

**Kaw River**

The New Kaw River Bridge at Lawrence (78814 A). Deane E. Ackers. Ills. 2200 w. Kan Engr—1916-17. Reinforced concrete bridge and its construction.

**Keadby Bridge**

Keadby Bridge (75587). 1500 w. Times Eng Supp—Nov. 24, 1916. A Scherzer lift bridge on Great Central Railway, England.

**Kiskiminetas**

A New Bridge at Kiskiminetas Junction, Pa. (74819). Ills. 1400 w. Ry Age Gaz—Nov. 24, 1916. Large structure across the Allegheny River.

**Loads**

Concentrated Live Loads for Highway Bridges (76017 A). Milo S. Ketchum. 5000 w. Univ Colo Jl Eng—Oct., 1916. Actual concentrated moving loads; specifications; distribution.

Moving Loads on Railway Underbridges (81203 N). William Bean Farr. Ills. 1000 w. Instn C E—No. 4177. Shearing stresses due to locomotives.

**Long Span**

Sciotoville Bridge Erection Is Well Started (75709). Ills. 1300 w. Eng News—Jan. 4, 1917. Latest progress on longest continuous span in the world.

**Louisville**

Old Ohio River Bridge at Louisville—Nearly Fifty Years in Service (76569). Ills. 3300 w. Eng News—Feb. 8, 1917. Famous old structure being replaced by modern bridge.

**Maintenance**

Inspection and Maintenance of Highway Bridges (78554). W. J. Carrel. Ills. 4000 w. Br Rds & Sts—May, 1917. Requirements for public safety, and expense involved.

**Metropolis Bridge**

Erecting and Swinging 720-Ft. Span of Metropolis Bridge (75437). Ills. 800 w. Eng News—Dec. 21, 1916. Methods employed.

**Meuse Bridges**

Ferro Concrete Bridges on the Meuse 76695 A). Ills. 1500 w. Surv'r—Jan. 26, 1917. Bridges at Namur and Liege, with details of design.

**Mississippi**

A New Bridge Over the Mississippi River (75924). Ills. 1500 w. Ry Age Gaz—Jan. 12, 1917. Rebuilt under traffic. Interesting methods.

**Missouri River**

Rebuilding the Missouri River Bridge of the Union Pacific R. R., Omaha, Nebraska (76670). Ills. 1800 w. Ry Rev —Feb. 10, 1917. New superstructure on old piers.

**Movable Bridges**

Etude Sur Les Ponts Mobiles (74883 C + D). B. Razelière. Ills. 72 pp. Pont Chaus Ann—Jan.-Feb., 1916. Comprehensive description of all important types.

**Piers**

Building Bridge Piers in Mississippi River (77208). C. F. Womelsdorf. Ills. 1600 w. Eng News—March 8, 1917. Foundations of highway bridge at Burlington, Iowa.

Deep Dredging Piers and Multiple Pneumatic Pier on the Thames Bridge (77336). Ills. 2600 w. Eng News—March 15, 1917. Foundations of N. Y., N. H. & H. R. R. bridge at New London, Conn.

Extending Piers for Double-Tracking B. & L. E. Allegheny River Bridge (77338). Ills. 1300 w. Eng News—March 15, 1917. Heavy new double-track bridge must make use of old piers enlarged.

Defective Foundation Causes Failure of Pier (81076). Ills. 2500 w. Eng

News-Rec—Sept. 13, 1917. Defective work and successful reconstruction.

Pier-Foundations of the Wanganui Bridge, New Zealand (81205 N). Robert West Holmes. Ills. 11 pp. Instn C E—No. 4168. Measures to prevent damage.

**Platte River**

Bridge Work on the Chalco-Yutan Cut-Off (80313). Map & Ills. 1500 w. Ry Age Gaz—Aug. 3, 1917. Structure over Platte River, on C., B. & Q., involves ingenious foundation methods for a difficult situation.

**Pontoon**

Pontoon for Transport of Stock Across the Zambesi River (78052 A). B. Warren Elliott. Ills. 500 w. Engng—March 23, 1917. Special features.

**Portland, Me.**

The Portland Bridge (75387 B). Eugene E. Pettee. Ills. & 10 plates. 22 pp. Bos Soc C E, Jl—Dec., 1916. History and description, cost, etc.

**Quebec**

Erection of the South Cantilever Arm of the New Quebec Bridge (74576 A). Ills. & Plate. 3000 w. Engr—Oct. 27, 1916. Serial, 1st part. Detailed accounts.

Jacking the Quebec Bridge (74376 A). Ills. 900 w. Ry & Loco Eng—Nov., 1916. The lifting jacks; their number and position.

The Accident to the Quebec Bridge (74575 A). Frank W. Skinner. Ills. 5600 w. Engng—Nov. 3, 1916. Serial, 1st part. Methods adopted to ensure safety, with details of accident.

The Accident to the Quebec Bridge (74308 A). Ills. 2500 w. Engr—Oct. 13, 1916. Also editorial. On the supposed cause.

The Quebec Bridge (75448 A). Ills. 3000 w. Ry Engr—Dec., 1916. Critical discussion of the cause of failure of lifting arrangements.

Spring Friction Will Hold Quebec Span Against Drag of Braked Trains (77692). A. J. Meyers. Ills. 2200 w. Eng News—March 29, 1917. Traction brake described.

Canadian Engineering Has Triumphed at Quebec (81288). Ills. 3000 w. Can Engr—Sept. 20, 1917. Central span of Quebec bridge successfully floated and hoisted.

Erection and Floating of Central Span (81291). Ills. 2000 w. Can Engr—Sept. 20, 1917. Floating arrangements, influence of the tides and general plan.

Mooring and Hoisting the Suspended Span (81290). A. J. Meyers and M. B. Atkinson. Ills. 4500 w. Can Engr—Sept. 20, 1917. General principles of last year's operations were again followed.

No Rocker Bearings nor Steel Castings This Year (81289). Archibald John Meyers. Ills. 2500 w. Can Engr—Sept. 20, 1917. Lower shoe of roller bearing riveted to girder while upper shoe is riveted to span and key carries the load during lifting.

The 640 Ft. Suspended Span of Quebec Bridge Hoisted to Permanent Position (81457). 3300 w. Eng & Con—Sept. 26, 1917. From the *Montreal Daily Star*. Various stages of the undertaking.

Quebec Bridge Central Span Successfully Hoisted (81484). A. J. Meyers. Ills. 3300 w. Ry Age Gaz—Sept. 28, 1917. Roller or key bearings used as supports during raising instead of rocker bearings and steel castings.

Quebec Suspended Span Successfully Hung from Cantilevers (81871). Harry Barker. Ills. 10 pp. Eng News-Rec—Sept. 27, 1917. Details of the work, describing new features in hoisting arrangements.

Another Large Railroad Bridge Completed (81101). Ills. 2000 w. Ry Age Gaz—Sept. 14, 1917. Bold design used by C. & O. at Sciotoville.

**Raising**

Raising a Bridge by Levers When Jacks Failed (75170). W. T. Penney. Ills. 1600 w. Eng News—Dec. 7, 1916. Emergency job in Costa Rica.

**Reconstruction**

Reconstruction of Fourth Ave. Bridge Over Long Island Railroad in Brooklyn, N. Y. (77276 A). James B. French. Ills. 800 w. Corn C E—Jan., 1917. Details of work.

Shift Three Truss Spans in Two Moves to Replace Old Girders (77047). Ills. 1700 w. Eng Rec—March 3, 1917. Bridge over Miami River at Dayton, O. Heavy double-track traffic.

Track Locations at Dayton Complicate a Bridge-Rolling Job (77693). Ills. 1900 w. Eng News—March 29, 1917. Dayton bridge across Miami River.

Reconstruction of Union Pacific Railroad Bridge at Omaha (79588 A). Plates. 2500 w. Engng—June 8, 1917. Details.

The Reconstruction of Koari Bridge, Great Indian Peninsula Railway (81202 N). Thomas Christie Hood. Ills. 2500 w. Instn C E—No. 4170. Details.

**Reinforced Concrete**

Detailed Cost of 113-Ft. Reinforced Concrete Through Girder Bridge Built Near Douglas, Ariz. (75662). Ills. 2500 w. Eng & Can—Dec. 27, 1916. Information from recent report of Lamar Cobb.

Failure of Reinforced Concrete Bridges in Prussia (80434 A). Ills. 700 w. Engng—July 27, 1917. Interesting description, from *Le Génie Civil*, of partial failure of viaducts built in 1910-11.

**Renewals**

Bridge Renewals Under Abnormal Conditions (79550 B). Ills. 4500 w. Ry Age Gaz—June 22, 1917. (Special no.) Methods adopted to maintain structures in the face of high prices.

**Repairs**

Restauration De Ponts En Béton Armé Fissuré (79429 B). Ills. 2200 w. Gen Civ—June 2, 1917. Method of repairing cracks and fissures in reinforced concrete arch bridges in Germany.

Saving a Railway Bridge Built 63 Years Ago (80170). Ills. 1500 w. Can Engr—July 26, 1917. Half-inch coating of granite applied to brick work of abuttment and eight piers, at Weston, Ont.

**San Domingo**

Building a Bridge Under Adverse Conditions in San Domingo (80677). E. S. Needham. Ills. 2000 w. Eng News-Rec—Aug. 23, 1917. Lack of local material and skilled labor.

**San Francisco**

Proposed Bridge Across San Francisco Bay (74546). H. Devereux. 1200 w. Ills. West Eng—Nov., 1916. Several plans are presented.

**Saskatoon**

University Bridge, Saskatoon (75711). C. J. Yorath. Ills. 1800 w. Can Engr —Jan. 4, 1917. Design and construction.

**Skew**

Centre Street Bridge, Calgary, Alberta (76773). George W. Craig. Read before Can. Soc. Civ. Engrs. Ills 5000 w. Can Engr—Feb. 15, 1917. Skew reinforced concrete bridge with grade of nearly four per cent, and traffic on two levels. Obstacles overcome.

**Specifications**

Discuss Illinois Bridge Specifications (75061). 1200 w. Eng Rec—Dec. 2, 1916. Expert opinion on unit stresses.

**Standard Plans**

Standard Highway-Bridge Plans Used on Country-Road System (77632). William C. Davidson. Ills. 1500 w. Eng Rec—March 24, 1917. Overflow bridges.

Standard Plans Solve Problem of State Highway Bridge Supervision in Illinois (77855). Clifford Older. Ills. 3000 w. Eng News-Rec—April 5, 1917. Systematized methods of design and approval.

**Steel**

Points in Steel Bridge Maintenance (80826). Ills. 1000 w. Eng News-Rec—Aug. 30, 1917. Experience on the Santa Fe. Safety assured by watching camber curve.

**Stresses**

The Method of the Ellipse of Elasticity and Its Application to Continuous Arches on Elastic Piers (81250 B). S. Moreell, Jr. Ills. 43 pp. West Soc Engrs, Jl—June, 1917. Explains application of a complete graphical method for finding the stresses.

**Suspension**

Notes on the Clifton Suspension Bridge (76362 N). L. S. McKenzie. Ills. 2500 w. Instn Mun & Cnty Engrs, Jl—Jan., 1917. History and description.

Suspension Bridge Solves Problem of Crossing Rio Chiriqui in Panama (79014). A. S. Zinn. Ills. 1000 w. Eng News-Rec—May 31, 1917. Highway crossing requires span of 410 feet.

Suspension Bridges in New Zealand (80407 A). Ills. 1200 w. Engr—July 20, 1917. Particulars of bridges designed and constructed by Joseph Dawson. Of historic interest.

**Swing**

Pyrmont Electric Swing Bridge (76705 A). Ills. 2500 w. Engr—Jan. 26, 1917. Serial, 1st part. Features, with details of power costs of operating and other data.

**Toggle Joint**

See same heading under MECHANICAL ENGINEERING, *Machine Elements and Design.*

**Viaducts**

Bloor-Street Viaduct, Toronto (74741 A). Ills. 400 w. Engr—Nov. 3, 1916. Particulars of design.

Erection Methods, Bloor Street Viaduct, Toronto (74712). J. Gordon Jack. Ills. 600 w. Can Engr—Nov. 16, 1916. Brief review of methods used in erection.

Jacking Up a Viaduct, Buckling Columns give trouble (74506). Ills. 2800 w. Eng News—Nov. 9, 1916. Steel viaduct in N. Y. City had to be jacked on account of footing settlement.

Viaduct 170 Feet High Erected Without Falsework by Special Steel Struts (74706). Ills. 900 w. Eng Rec—Nov. 18, 1916. Deck truss spans 102 feet long supported temporarily at center and built as cantilevers to a bearing on next tower.

Renewal of Viaduct-Carrying Caledonian Ry. Over the River North Esk at Marykirk (80468 N). William Fraser. Ills. 1500 w. Per-Way Instn, Jl—April, 1917. Details of the work.

Approaches of Bloor Street Viaduct, Toronto, Have Concrete-Covered Steel Frames (75183). W. F. B. Rubidge. Ills. 1200 w. Eng Rec—Dec. 9, 1916. Massive appearance produced.

Completing the Municipal Bridge at St. Louis, Mo. (75325). Ills. 1800 w. Eng News—Dec. 14, 1916. Design and construction of 3-mile approach viaduct.

Repairing Riverside Drive Viaduct Across Manhattan Valley (77310 B). Eugene W. Stern. Ills. 1200 w. Mun Engrs Jl—Feb., 1917. Details of interesting work.

Repairing Riverside Drive Viaduct Across Manhattan Valley (77526 B). 2500 w. Mun Engrs Jl—March, 1917. Discussion of Eugene W. Stern's paper.

Railway Forces Construct Viaduct Over Five Tracks (78345). Ills. 900 w. Eng News-Rec—April 26, 1917. Work on D. L. & W. R. R. near Scranton.

Bids for Concrete Arch Viaduct Less Than For Steel Design (79871). H. G. Perring. Ills. 1000 w. Eng News-Rec—July 12, 1917. James River bridge at Richmond, Va. Advantages of concrete over steel.

De Viaduct Over Het Ravijn der Tjipamottan (80033 B). J. H. A. Haarman. Ills. 3300 w. Ingr—June 23, 1917. Railway viaduct 1017 feet long over Tjipamottan ravine, Java.

**Wooden Bridges**

Report of Committee VII—On Wooden Bridges and Trestles (76797 C). 18 pp. A R E A, Bul—Jan., 1917. Design of docks and wharves, reinforced concrete trestles, etc.

## CONSTRUCTION

**Arches**

The Design of Symmetrical Hingeless Concree Arches (74671 B). Victor H. Cochrane. 66 pp. Engrs' Soc West Penn, Pro—Nov., 1916. Formulas and diagrams for making designs in accordance with the elastic theory.

Design of Flat Arches with Fixed Ends (78668 A). G. R. Maguel. 2500 w. Engng—Apr. 27, 1917. Explains a new method of quickly finding the maximum stresses in flat arches under dead and live loads.

**Batterie des Maures**

A Floating Structure of 3,700 Tons Displacement (80583). Ills. 1500 w. Can Engr—Aug. 16, 1917. Detailed description of a ferro-concrete structure for testing torpedoes, built on land and floated into the Mediterranean and how the sinking was accomplished.

**Building Details**

Addition to the Union League Club (77318 B). Frank E. Brown, with discussion. Ills. 20 pp. West Soc Engrs, Jl—Jan., 1917. Complicated work.

Art Gallery Built on a 200-ft. Bridge (77533). Ills. 1000 w. Eng News—March 22, 1917. New extension to Chicago Art Institute.

**Buildings**

The Strength of Buildings (78865). 1300 w. Times Eng Supp—Apr. 27, 1917. Effects of recent explosion in East London on buildings of various sorts of construction.

Methods of Reconstruction of California-Hawaiian Sugar Refinery Buildings at Crockett, California (79277 A). J. J. Rosenthal. Ills. 2500 w. West Eng—June, 1917. Reconstructed of permanent fireproof material. Details of work.

The Municipal Convention Hall, Cleveland (79348 B). Frederic H. Betz. Ills. 5 pp. Cleve Eng Soc, Jl—May, 1917. Descriptive.

The Motion Picture Theater (79610 B). Charles A. Whittemore. Ills. 3000 w. Archt Forum—June, 1917. Serial, 1st part. Comparison of two types of plan.

Tower Building Occupies Entire New York City Lot (81904). Ills. 1000 w. Eng News-Rec—Oct. 18, 1917. Details of design and construction.

**Camouflage**

Entrenchments and Camouflage (81372 C). Lecture by British officer skilled in landscape gardening. Ills. 64 pp. Prof Mem—Sept.-Oct., 1917. General principles of entrenchment making, and methods of protection.

**Cantonments**

Building the Army Cantonments (79897). Ills. 13800 w. Mun Jl—July 12, 1917. Serial, 1st part. Plans for buildings, water supply, sewerage, and other conveniences for 650,000 men to be ready in ten weeks.

Housing the Navy Ashore (79746). Ills. 2000 w. Eng News-Rec—July 5, 1917. Wood cantonments at Charleston, S. C., for housing army in training.

Engineering Team-Work Aids Rush Army Job at Camp Upton, N. Y. (80675). Robert K. Tomlin, Jr. Ills. 3500 w. Eng News-Rec—Aug. 23, 1917. How the work was organized and carried out.

Army Cantonment at Louisville Laid Out Like Suburban Development (80828). Nathan C. Rockwood. Ills. 1500 w. Eng News-Rec—Aug. 30, 1917. Planning of roads, sewers, water-works, etc.

Commandeer Organization for Illinois Cantonment Construction (80824). W. W. DeBerard. Ills. 3000 w. Eng News-Rec—Aug. 30, 1917. Progress made in camp at Rockford, Ill.

The National Army's Three Southern

Cantonments (81078). H. D. Hammond. Ills. 5000 w. Eng News-Rec—Sept. 13, 1917. Details of work at Columbia Camp; Camp Gordon, Atlanta; and Camp Lee, Petersburg.

Building Army City in Wilderness Was the Problem at Camp Pike (81870). Ills. 2500 w. Eng News-Rec—Sept. 20, 1917. Site for Arkansas cantonment was five miles from nearest railroad. Results accomplished.

Construction Was Speedy at Camp Lewis (81711). Nathan A. Bowers. Ills. 1200 w. Eng News-Rec—Oct. 4, 1917. Largest of national army cantonments at American Lake, Washington, accommodating 48,000 men, finished in fifty-six days.

**Catch-Basins**

Catch-Basin Construction and Maintenance (76100 B). Ills. 63 pp. Bos Soc C E, Jl—Jan., 1917. Topical discussion and bibliography.

**Cement Guns**

Cement-Gun Construction Methods (79925). Bryan Cheves Collier. Ills. 2000 w. Can Engr—July 12, 1917. Reviews application of gunite to wall construction and similar work.

**Cement Mill**

Electric-Driven Cement Mill of Oregon Portland Cement Co. (75436). D. C. Findlay. Ills. 2500 w. Eng News—Dec. 21, 1916. Mill of reinforced concrete with all machinery electrically driven.

**Channel Tunnel**

Le Tunnel Sous-Marin Entre La France Et L'Angleterre (79411 C + D). A. Moutier. Ills. 10,000 w. Soc Enc Ind Nat—Mar.-Apr., 1917. Extended discourse on the engineering obstacles to be overcome, geological formation, methods of excavation, etc.

**Chimneys**

Chimneys: Their Design and Construction (77447). Harold L. Alt. Ills. 2500 w. Ht & Vt Mag—March, 1917. Serial, 1st part. Common chimney faults are considered in this number.

Repairs to Factory Chimneys (81201 N). Thomas Henry Ward. Ills. 2000 w. Instn C E—No. 4150. Repairing a chimney 163 ft. in height, in the East Indian Railway collieries.

**Cleveland Subway**

Cleveland Subway Cuts Sheeted With Round Piles (80178). Ills. 2000 w. Eng News-Rec—July 26, 1917. Methods described.

**Coal Pier**

New Curtis Bay Coal Pier of the Baltimore & Ohio R. R., at Baltimore 77662). Ills. 1200 w. Rv Rev—March 24, 1917. Plant for loading coal into vessels by conveyor belts from car dumpers.

**Cofferdams**

Heavy Bracing Gives Large Open Pockets in Deep Cofferdam (76343). Ills. 1200 w. Eng Rec—Jan. 27, 1917. Power plant on Ohio River requires large amount of scattered tunnel, foundation, and concrete work.

Unusual Coffer-dam for 1000-Foot Pier, New York City (77324 D). Charles W. Staniford. Ills. 45 pp. A S C E, Pro—Feb., 1917. Design and construction of a steel sheet-pile coffer-dam of unusual type.

Unusual Coffer-dam for 1000-foot Pier, New York City (78318D). Ills. 27 pp. A S C E, Pro—April, 1917. Discussion of Charles W. Staniford's paper.

Unusual Coffer-Dam for 1000-Foot Pier, New York City (80662 D). Ills. 2500 w. A S C E, Pro—Aug., 1917. Continued discussion of Charles W. Staniford's paper.

Cofferdam for New Locks at St. Mary's Falls Canal, Sault Ste Marie, Mich. (78792 C). W. J. Graves. Ills. 20 pp. Prof Mem—May-June, 1917. Its design, construction and cost. National importance of this work.

**Columns**

Column Sections Quickly Found by Novel Diagram (75710). H. G. Nevitt. Ills. 1000 w. Eng News—Jan. 4, 1917. Design and applications.

Formula for Spirally Reinforced Concrete Columns in the Revised Portland Building Code (76020 A). Henry M. Blood. 1200 w. Ore Soc Engrs, Jl—Nov., 1916. Aims to show that the proposed regulations are more conservative than the present ones, and simpler to apply.

**Competitive Bidding**

Nelson's Form for Competitive Bidding (76125). H. W. Nelson. 4000 w. Elec Rv & Wes Elec—Jan. 20, 1917. Full text of this form.

**Concrete**

Concreting in Cold Weather (74442 A). Ills. 1500 w. Contr—Nov. 1, 1916. Points to be remembered in winter concreting.

Build Concrete Shell Around Tall Steel Water Tanks (80587). Ills. 1500 w. Eng News-Rec—Aug. 16, 1917. Details of work carried out to improve real estate values.

Fire-Wrecked Concrete Building Repaired for Service (80304). Ills. 1800 w. Eng News-Rec—Aug. 2, 1917. Columns and floor units of Far Rockaway warehouse replaced.

Elevator Pits and Machinery Floors in Concrete Buildings (74808). Albert M.

Wolf. Ills. 2000 w. Eng & Con—Nov. 22, 1916. Design and construction.

Levee Paving with Concrete (76292 C). T. M. McCarroll. Ills. & plate. 16 pp. Prof Mem—Jan.-Feb., 1917. Origin and history, method and cost of construction.

Placing Ornamental Concrete on Steel Frame (75708). Harry L. Dlyn. Ills. 2300 w. Eng News—Jan. 4, 1917. Technic of covering structural steel frame.

Points of Interest in Connection with Some Concrete Buildings Recently Erected in and Around Montreal (76116). C. M. Morssen. Abstract of paper before Can. Soc. of Civ. Engrs. 2000 w. Can Engr—Jan. 18, 1917. Interesting because of size, finish, time of construction, complicated problems, etc.

Subaqueous Concrete Work on the Cape Fear River, North Carolina (76293 C). C. S. Ridley. Ills. & 2 plates. 10 pp. Prof Mem—Jan.-Feb., 1917. Details of work done in sealing the bottoms of lock cofferdams.

Cold Weather Concreting (76751). Ills. 2000 w. Contg—Feb., 1917. Methods of heating, aggregate, water, forms, and buildings.

Colt's Plant Completed on Schedule Time (76509). Ills. 2000 w. Eng Rec—Feb. 3, 1917. Erection of 11-acre building for Hartford manufacturing concern.

Fast Concreting in Building Construction (76477). J. C. Worrell. Ills. 1000 w. Contr—Feb. 2, 1917. Rapid work in St. Paul.

Polished Concrete in Surface Structures of Boston Subways (76508). Lawrence M. Manley. 2000 w. Eng Rec—Feb. 3, 1917. Special architectural features.

Second-Largest Concrete Building Erected (76507). Ills. 2000 w. Eng Rec—Feb. 3, 1917. Two units of Hoboken water terminal containing 660,000 sq. ft. of floor.

Crack in New Concrete Arch Explained by Freezing of Pocketed Water (77024). A. W. Zesiger. Ills. 3000 w. Eng News—March 1, 1917. Explanation of curious accident in Cleveland.

Delivering Mixed Aggregate Along the 85-Mile Winnipeg Aqueduct (77691). Douglas L. McLean. Ills. 1800 w. Eng News—March 29, 1917. Manufacturing and transporting methods.

Precautionary Measures for Concreting in Freezing Weather (78807 A). J. A. Stalfort. 2000 w. E Cb Balt, Jl—May, 1917. Outlines methods that will give success in winter months. Results of experience.

Twin Mixer Plant Places Five Thousand Yards of Winter Concrete Each Month (78597). Ills. 1800 w. Eng News-Rec—May 10, 1917. Work at Maywood, Ill. Novel plant features and construction methods.

Diagrams Facilitate the Design of Concrete Forms (80942). A. Norman Laird. Ills. 700 w. Eng News-Rec—Sept. 6, 1917. After systematic study of conditions the sizes of members may be readily traced from standardized curves.

One Hundred Concrete Dwellings Built as One Contract Job (80940). Ills. 2000 w. Eng News-Rec—Sept. 6, 1917. Methods permit completion of one house every three days.

Comparisons of Various By-Laws Covering Flat Slab Concrete Buildings, with Actual Tests (81947). W. W. Pearse. Ills. 1000 w. Can Engr—Oct. 18, 1917. Serial, 1st part. Codes compared give fairly similar results.

Largest Concrete Building Now Under Construction at St. Louis (81978). W. J. Knight. Ills. 2500 w. Eng News-Rec—Oct. 25, 1917. Bevo bottling and shipping plant is 8 stories high and covers three acres.

**Concrete Chimney**

Interlocking Blocks Tied Together Make Concrete Chimney (79872). W. S. Winters. Ills. 800 w. Eng News-Rec—July 12, 1917. System common in Europe used at Toronto.

**Concrete Piles**

De betonpalen volgens het systeem De Waal en de toepassing er van tot het maken van fundeeringen onder water (74860 B). F. Muller. Ills. 1600 w. Ingr—Oct. 21, 1916. De Waal system of concrete piles for underwater foundations.

**Construction**

Structural Engineering (77240 A). Ewart S. Andrews. Ills. 2200 w. Eng Rv—Feb. 15, 1917. Problem of housing the laboring classes; steel work; reinforced concrete, etc.

**Contractors**

The Problem of the General Contractor (79611 B). Wilfred W. Beach. 4000 w. Archt Forum—June, 1917. Serial, 1st part. Relations between architect and contractor.

**Contracts**

General Provisions Forming Part of Specifications for Contracts for Public Works (81547 A). 4000 w. Gen Elec Rev—Oct., 1917. General provisions now in force concerning contracts.

**Cribwork**

Repairing Timber Cribwork (76119). A. E. Eastman. Ills. 1700 w. Can Engr—Jan. 18, 1917. Work on a lock of one of the canals of the St. Lawrence River.

Economical Devices in Cribwork Construction (78412). A. E. Eastman. Ills.

1200 w. Can Engr—Apr. 26, 1917. Details of skidway.

**Damages**

Penalties and Liquidated Damages (77061 B). William B. King. 3300 w. Archt Forum—Feb., 1917. Serial, 1st part. Rules adopted by the courts.

**Dams**

The Reconstruction of the Stony River Dam (78316D). 20 pp. A S C E, Pro—April, 1917. Discussion of F. W. Scheidenhelm's paper.

China Mills Dam and Sluiceway of Suncook Mills (78773 B). Arthur T. Safford. Ills. 2500 w. Bos Soc C E—May, 1917. Replacing a timber crib and masonry dam with a heavy concrete gravity structure.

Multiple-Arch Dams on Rush Creek, California (78838 D). 1800 w. A S C E, Pro—May, 1917. Discussion of L. R. Jorgensen's paper.

The Reconstruction of the Stony River Dam (78842 D). 40 pp. A S C E, Pro—May, 1917. Continued discussion of F. W. Scheidenhelm's paper.

Barrage A Arches Multiples En Béton Armé (79417 B). A. Pawlowski. Ills. 3400 w. Gen Civ—May 12, 1917. Multiple arch dam of reinforced concrete, Ambursen type, on the Sélune River, France.

Note Sur Les Barrages Et Les Digues A Profil Triangulaire (81386 C + D). M. Pigeand. 7000 w. Pont Chaus Ann—May-June, 1917. Mathematical treatment of the design of dams and dikes of triangular section as regards stability.

**Daylight Illumination**

The Lighting Schemes of Thomas Jefferson (77642 C). Walter Sheldon Rodman. Ills. 16 pp. Ill Eng Soc, Trans—March 20, 1917. Daylight illumination in structures designed by him.

**Design**

Fluctuations in Prices Make Changes in Design Desirable (77387). P. R. Elfstrom. 1500 w. Eng Rec—March 17, 1917. Effect of rise of steel.

**Diagrams**

Useful Diagrams for the Design of Subway Sidewalks (80589). Henry Hyman. 1200 w. Eng News-Rec—Aug. 16, 1917. Method eliminates tedious calculations for bending moments.

**Domes**

Design of Steel and Reinforced Concrete Domes (76351 A). C. S. Whitney. Ills. 6000 w. Corn C E—Dec., 1916. Abstract from Master's thesis. Types, and theories.

**Dredge**

Clamshell Dredge with 195-Ft. Boom (77019). Ills. 1400 w. Eng News—March 1, 1917. Used on California levee.

**Dredging**

Dredging Equipment for Any Contract Should Be Chosen to Fit Exactly the Conditions Expected (75370). Arthur M. Shaw. Ills. 5000 w. Serial, 1st part. Eng Rec—Dec. 16, 1916. Conditions governing dredging on reclamation work.

**Earth Slip**

Notice Sur Les Galeries Drainantes (74908 C + D). A. Perrissoud. Ills. 5100 W. Pont Chaus Ann—March-April, 1916. Note on drainage conduits for preventing underlying clay stratum from being washed out.

**Engineering**

La Practica De La Profesion En Cuba (79405 A). L. M. Pedroso. 7200 w. Soc Cub Ing Rev—May, 1917. Suggestions for wider activities of engineers in Cuba, especially in regard to military affairs.

Engineering Economics (78995). J. A. L. Waddell. From a series of lectures at the Univ. of Kansas. 2000 w. Eng & Con—May 30, 1917. General features of economies of design and construction.

**Engineers**

The Position of the Engineer in the Community and His Relations to the Contractor (81048). S. M. Swaab. 2800 w. E Cb Phila, Pro—Sept., 1917. Qualifications desirable in engineers.

**Estimates**

Compensation for Competitive Bidding (75939). George W. Hill. 1500 w. Elec Rv & Wes Elec—Jan. 13, 1917. Serial, 1st part. Discusses practice of expecting contractors to submit free estimates.

**Excavation**

Method and General Cost of Rock Excavation for the Inlet Swamp Drainage District, Illinois (74627). A. W. Naylor. From a thesis prepared for the Missouri Sch. of Mines & Met. 800 w. Eng & Con—Nov. 15, 1916. Methods employed.

Winnipeg Aqueduct Excavation (76776). Abstract of an article by William Smaill, in *Excavating Engr.* Ills 1200 w. Can Engr—Feb. 15, 1917. Difficulties encountered and methods adopted to overcome them.

Drag Line Excavation Methods in Construction of Winnipeg Aqueduct (77497). Ills. 1000 w. Eng & Con—March 21, 1917. Methods of operation and details of work.

Excess Rock Excavation in Catskill Aqueduct Tunnels (77021). Ills. 1200 w. Eng News—March 1, 1917. Data on overbreakage.

Powerful Drill-Car Effective in Uneven Spongy Rock (78086). J. B. Bassett. Ills. 2000 w. Eng News-Rec—April 12, 1917. Rock excavation in LeClaire canal.

Pitchforks, Centrifugal Pumps and 160-Ton Draglines Dig Aqueduct Ditch Through Muskeg Bogs (78336). William Smaill. Ills. 4500 w. Eng News-Rec—April 19, 1917. Serial, 1st part. Construction of Winnipeg conduit.

Methods of Excavating by Machinery (79073 N). C. G. Calman. Ills. 1500 w. Comwh Engr—May, 1917. Serial, 1st part. Describes machinery employed, and conditions in Australia.

Dragline Makes Heavy Railroad Cut Through Cleveland (79873). Ills. 1500 w. Eng News-Rec—July 12, 1917. Grading by a machine having an output of 300 cubic yards per hour.

**Factories**

Building the Factory of Concrete (76963 A). H. Colin Campbell. Ills. 3000 w. Ind Man—March, 1917. Arguments favoring concrete structures.

Factory Building Has Central Craneway with Lateral Wings (76866). Ills. 1500 w. Eng Rec—Feb. 24, 1917. Plant at Flushing, N. Y., planned for efficient handling of materials.

Comparative Costs for Concrete and Timber Factory Buildings (74809). F. E. Davidson, with statement by T. L. Condron. 3500 w. Eng & Con—Nov. 22, 1916. Discusses economics, giving comparative costs.

Cost of Factory Buildings of Timber and of Concrete (74513). 3200 w. Eng News—Nov. 9, 1916. Statements of costs of the two materials.

**Flat-Slab Design**

Compares Flat-Slab Design Requirements in Light of Test Results (77222). A. R. Lord. 2000 w. Eng Rec—March 10, 1917. Summary of Chicago tests, with recommendations.

**Floors**

New Type of Concrete Floor on St. Louis bridge (75501). Ills. 1300 w. Eng News—Dec. 28, 1916. Steel forms for concrete floor left in place.

Discussion of "The Groined Arch as a Means of Concrete Floor Construction" (76792 B). 15 pp. Bos Soc C E, Jl—Feb., 1917. H. Whittemore Brown's paper is discussed.

Concrete Floors in Industrial Buildings (77623 A). H. Colin Campbell. 3500 w. Ind Man—April, 1917. Requirements of factory floors.

To Secure Good Concrete Floors Follow These Suggestions (78083). W. P. Anderson. 2000 w. Eng News-Rec—April 12, 1917. Selection of aggregate important; satisfactory patching.

Girderless Reinforced-Concrete Floor System Has Straight-Bar Reinforcement (79232). Ills. 1200 w. Eng News-Rec—June 14, 1917. Distinguished by no bends in bars and by chairs that hold reinforcement in place.

**Foundations**

Sinking Extension Caisson Foundations for a St. Louis Hotel (77532). Ills. 800 w. Eng News—March 22, 1917. Statler Hotel.

Foundation and Foundation Plans (78544). D. O. Barrett. Ills. 2500 w. Power—May 8, 1917. Design of foundation finally adopted for a line of engines ranging from 20- to 150-p.p. capacity.

Making Concrete Foundation for Engines and Other Power Plant Apparatus (78373). W. A. Taller. 2500 w. Natl Engr—May, 1917. How ingredients should be selected and work done.

Winnipeg Sub-Surface Formation and Suitable Heavy Foundation Types (78905). J. J. Rankin. 4500 w. Can Engr—May 24, 1917. Geological formation considered for foundations.

Progress Report of the Special Committee to Codify Present Practice on the Bearing Value of Soils for Foundations (80658 D). Ills. and bibliography. 78 pp. A S C E, Pro—Aug., 1917. Also a standard screen scale for testing sieves.

Sink 7700-Ton Drop Shafts to Exact Line and Grade by Dredging (81872). Ills. 2500 w. Eng News-Rec—Sept. 27, 1917. Foundation work for large Cincinnati power station, requiring 50,000 yards of concrete, is finished within a year.

**Gasholders**

Gasholder at the Tottenham Light, Heat and Power Company's Works (80088 A). Ills. Plates. 4500 w. Engng—July 6, 1917. Detailed description.

**Grain Elevator**

The New 2,500,000 Bushel Elevator of the Washburn-Crosby Company (78742 A). R. G. Kenley. Ills. 800 w. Af Eng Soc of Minn, Bul—May, 1917. Large elevator at Minneapolis.

Contractors Speed Grain-Elevator Construction Despite Labor and Material Shortage (80586). A. M. Crain. Ills. 1500 w. Eng News-Rec—Aug. 16, 1917. Great use of machinery. Large storage facilities.

**Grouting**

Grouting the Foundation of the Elephant Butte Dam (79600). Ills. 2500 w. Eng News-Rec—June 28, 1917. Upstream row of grouted holes and two downstream rows of drainage wells serve as telltales.

**Handbooks**

History of Structural Steel Handbooks (77213). R. Fleming. Ills. 2000 w. Eng News—March 8, 1917.

**Industrial Towns**

Clarkdale, Arizona, United Verde's Million Dollar Town (81488). T. C. Roberts. Ills. 1500 w. Eng & Min Jl—Sept. 29, 1917. A modern company town.

**Labor-Saving**

Concrete Contractor Can Use Labor-Saving Plant to Cut Cost (76344). W. P. Anderson. Ills. 1000 w. Eng Rec—Jan. 27, 1917. Mechanical plant shown to be profitable.

**Levees**

Moving $500,000 Worth of Dirt on Vincennes, Ind., Levee Job (74440 A). Stanley E. Bates. Ills. 2500 w. Contr—Nov. 1, 1916. Day and night operation.

**Loading**

Soil-Bearing Tests Determined Loading on Chicago Track-Elevation Work (74830). R. H. Ford. Ills. 1500 w. Eng Rec—Nov. 25, 1916. Investigation justify 3900 pounds per square foot on clay or sand.

**Locks**

Construction of North Guide Wall of Troy Lock Without Enclosing with Cofferdam (78795 C). John J. McCabe. Ills. 15 pp. Prof Mem—May-June, 1917. Details of work with summary of costs.

**Masonry**

La Reconstruction Rapide Des Ponts En Maçonnerie (74884 C + D). Descubes and Barrillon. Ills. 4500 w. Pont Chaus Ann—Jan.-Feb., 1916. Rapid rebuilding of masonry bridges by army engineers.

Report of Commitee VIII—On Masonry (77300 C). Ills. 77 pp. A R E A—Feb., 1917.

Japanese Masonry Work (78834). J. L. Harrison. Ills. 900 w. Eng & Con—May 23, 1917. Peculiarities of the work.

Masonry (81252 C). Ills. 32 pp. Am Ry Eng Assn, Bul—July, 1917. Specifications for constructing and driving concrete piles, cast-in-place piles, retaining walls, etc.

**Mexico**

Die neue Boquilla-Talsperre in Mexico (82002 B). E. Brönimann. Ills. 2000 w. Schweiz Bau—Sept. 22, 1917. New dam for large power undertaking at Boquilla, Mexico.

**Military Engineering**

Consolidation of Trenches, Localities and Craters After Assault and Capture (77493 C). Ills. 21 pp. Prof Mem—April, 1917. Principles and methods applied.

Notes on Military Engineering (79091 A). Percy E. Barbour. Ills. 2500 w. Worc Poly Inst, Jl—May, 1917. Duties of the engineer in war

The Influence of the European War Upon the Art of Field Fortifications (80147 B). F. B. Wilby. Ills. 65 pp. Prof Mem—July-Aug., 1917. General principles which govern such fortifications, and means of carrying them out.

The German Shelters on the Somme (80145 B). Ills. 1500 w. Prof Mem—July-Aug., 1917. Details of bomb-proof shelters of various types.

A Visit to the English Front in France (80146 B). D. Victoriano Casajus. Ills. 12000 w. Prof Mem—July-Aug., 1917. Serial, 1st part. Considerations of war methods from actual observation.

**Military Hospitals**

The Plan and Construction of Military Hospitals (79609 B). Charles Butler. Plans. 3500 w. Archt Forum—June, 1917. Mainly details French war hospitals.

**Mill Building**

Heavy Crane Loads and Wide Aisles Control Steelwork Design of Navy's Huge Structure Shop (78337). Ills. 1500 w. Eng News-Rec—April 19, 1917. Mill building at Norfolk yard.

**Mining Towns**

Design of Buildings in Mining Towns (79262). R. H. Hamill. Ills. 3000 w Cl Age—June 16, 1917. Kinds of underpinning and roofing, chimneys, flues, fireplaces, etc.

**Office Buildings**

Comparative Designs of Office Buildings (74614 B). Fred Ruchti. Ills. 50 pp. West Soc Engrs, Jl—Oct., 1916. Reviews and collects some important details of Chicago structural steel buildings, new and old.

**Organization**

Homogeneous Organization Speeds Work at Ayer Cantonment (80301). Ills. 4000 w. Eng News-Rec—Aug. 2, 1917. Organization makes possible the construction of 40 buildings a day.

**Piers**

Enormous Deep Water Piers at Halifax (74692). Ills. 500 w. Contg—Nov., 1916. Serial, 1st part. Submerged rock excavation for large concrete block walls.

The Chicago Municipal Pier (74413 B). Ira W. Hoover. Ills. 1500 w. Brkbldr—Oct., 1916. Detailed description.

A Departure in the Design of Export Coal Piers (79245). Ills. 2500 w. Ry Age Gaz—June 15, 1917. Novel features of B. & O. pier at Baltimore.

Advantages of Concrete in Pier Construction (81390). H. Colin Campbell. Ills. 2500 w. Naut Gaz—Sept. 13, 1917. Examples of recent concrete construction at various points.

**Pier Sheds**

The Terminal Shed and Warehouse (77831A). H. McL. Harding. Ills. 2500 w. Int Mac Eng—April, 1917. Details of design and construction.

**Pile Driving**

Drive 3776 Concrete Piles in 30 Days For Navy (79868). Ills. 1500 w. Eng News-Rec—July 12, 1917. Details of methods used to hasten government work.

**Piling**

Inverted Hammers Pull 72-Foot Sheeting at New York Pier (74709). C. W. Staniford. Ills. 1200 w. Eng Rec—Nov. 18, 1916. Sheeting successfully extracted by method heretofore considered only for piles of much less penetration.

Pile-driving and the Supporting Power of Piles (75976 A). Henry Adams. 4000 w. Surv'r—Dec. 29, 1916. Driving and using piles.

Piling for Excavating Purposes at the Dalmarnock Electrical Power Station (78829 A). C. B. Sneddon. Ills. 2500 w. Ir & Cl Trds Rev—May 4, 1917. Method of piling adopted, and difficulties.

**Pipe-Laying**

Pipe-Laying by Steam Shovel (75320). Ills. 1500 w. Mun Jl—Dec. 14, 1916. Details of work and cost.

**Plaster Work**

Decorative Plaster Work (74414 B). A. D. F. Hamlin. Ills. 3000 w. Brkblder—Oct., 1916. Serial, 1st part. Historical review of the work of the Greeks and Romans.

**Progress Chart**

Predict Labor Demand Before Job is Started (81757). Dan Patch. 1200 w. Eng News-Rec—Oct. 11, 1917. New use of progress charts combined with "bogey scores" makes it possible to tell why actual work varies from estimate.

**Public Works**

Les Travaux Publics Après La Guerre (79410 C + D). P. Toulon. 9000 w. Soc Enc Ind Nat—Mar.-Apr., 1917. General considerations of construction of highways, railways, docks and harbor improvements, interior navigation works and electric central stations.

**Reconstruction**

Reconstructing Union Pacific Bridge at Omaha (76080). Ills. 3000 w. Ry Age Gaz—Jan. 19, 1917. Old spans replaced by new superstructure, shifted into position laterally in short time.

La Reconstruction Dans Les Régions Envahies (79418 B). G. Espitallier. Ills. 3200 w. Serial, 1st part Gen Civ—May 12, 1917. Plans for construction of barracks and bungalows in the invaded regions of France.

La Reconstruction Des Agglomérations Rurales (80048 B). G. Espitalier. 4800 w. Gen Civ—July 7, 1917. Sanitary considerations that must be regarded in the re-occupation of the invaded regions of France.

**Reinforced Concrete**

Charts for Reinforced-Concrete Design (76286). Roy E. Ward. 2000 w. Eng & Con—Jan. 24, 1917. Charts constructed on the nomographical principle.

Construction Features, Plant Layout, Methods and Costs of Constructing a Reinforced Concrete Warehouse at Los Angeles Harbor, California (75664). W. D. Jones. Ills. 1500 w. Eng & Con—Dec. 27, 1916.

Design and Construction Features of a Reinforced Concrete Slurry Elevator (75674). D. C. Findlay. Ills. 1000 w. Eng & Con—Dec. 27, 1916. Novel methods used at Oswego, Ore.

Methods of Supporting Brick and Trim in Piers and Spandrels of Reinforced Concrete Buildings (76285). Albert M. Wolf. Ills. 700 w. Eng & Con—Jan 24, 1917. Best practice.

Recommended Specifications for Reinforced Concrete Design (75676). 3500 w. Eng & Con—Dec. 27, 1916. Recently issued specifications of Portland Cement Assn.

**Retaining Walls**

Formulas for Width of Base of Gravity Retaining Walls (74411). T. A. Smith, 1200 w. Eng Rec—Nov. 4, 1916. Neatwork dimensions computed. Width of footing given by formulas.

Retaining Wall Failure at Lock No. 13, Kentucky River (74631 B). H. G. McCormick. Ills. & plate. 11 pp. Prof. Mem—Nov.-Dec., 1916. Account of failure and probable causes.

Some Economical Types of Retaining Walls (77833). C. P. Richardson. Ills. 900 w. Ry Age Gaz—April 6, 1917. Use of ties in the form of cribbing led to development of substitute constructions in concrete.

Note Sur Un Mur De Soutènement (81387 C + D). M. Raby. Ills. 3700 w. Pont Chans Ann—May-June, 1917. Design and construction of a reinforced concrete retaining wall at Algiers.

**Remodeled Plant**

Collinsville Plant Remodeled (79792). Thomas Wilson. Ills. 1500 w. Power—July 10, 1917. Reconstructing a plant while in constant operation.

**Repointing**

Repointing Sea Wall at Governors Island, N. Y., With Cement Gun (80143 B). Henry N. Babcock. Ills. 2000 w. Prof

Mem—July-Aug., 1917. Details of the work and the results.

**Roofs**

Condensation Under Various Types of Roofs Shown by Tests (79751). 1500 w. Eng News-Rec—July 5, 1917. Determine relative effectiveness of various materials.

**Salvage Work**

Three Washed-Out Steel Spans Replaced in Ten Days (76130). Ills. 1200 w. Eng Rec—Jan. 20, 1917. Rapid and difficult salvage work in South Carolina.

**Schoolhouses**

Some Fundamentals of Schoolhouse Design (79828 B). C. L. Wooldridge, with discussion. 7500 w. Engr Soc of W Penn —June, 1917. Methods at Pittsburgh, Pa.

One-Story and Open-Air Schoolhouses in California (80299 B). William C. Hays. Ills. 2500 w. Archt Forum—July, 1917. Details of schoolhouses built to meet Pacific Coast conditions.

**Selling Services**

Selling the Services of a Construction Company (80673). Extracts from papers by Leonard C. Watson, William P. Anderson, and J. P. H. Perry. 3500 w. Eng & Con—Aug. 22, 1917. Methods employed by large construction companies in selling their services for private work.

**Sewers**

See same heading under MUNICIPAL.

**Sheffield, Eng.**

Covering in the River Sheaf at Sheffield (75631 A). Ills. 700 w. Engr—Dec. 8, 1916. Interesting work.

**Slabs**

Method of Designing a Rectangular Reinforced Concrete Flat Slab, Each Side of Which Rests on Either Rigid or Yielding Supports (74790 D). 32 pp. A S C E, Pro—Nov., 1916. Continued discussion of A. C. Janni's paper.

**Specifications**

Specifications and Contracts (78556). E. W. James. 3000 w. Br Rds & Sts—May, 1917. Outlines certain standards.

Some Points in Connection with Engineering Specificatons (79321 N). J. Shepherd, with discussion. 18000 w. Instn E E, Jl—May, 1917. Outlines the skeleton of a specification, and gives examples.

Revised Specifications For Mill Construction (79599). 2000 w. Eng & Con—June 27, 1917. Recommended by the Nat'l Fire Protection Assn. Committee on Uses of Wood in Building Construction.

**Spillway**

Difficult Construction for Intricate Design of Ripon Siphonic Spillway, California (75374). 1500 w. Eng Rec—Dec. 16, 1916. Detail cost.

Concrete Spillway Defects Caused by Construction Negligence (77854). Eugene Lauchli. Ills. 1000 w. Eng News-Rec—April 5, 1917. Quality in workmanship and materials the cause.

**Stacks**

Foundry and Workshop Chimneys (74567 A). Walter J. May. Ills. 1500 w. Mech Wld—Nov. 3, 1916. Deals with stacks for other than steam-boiler purposes.

The Design of Steel Stacks (74806). H. M. White. 1400 w. Eng & Con—Nov. 22, 1916. Editorial criticising an article by W. A. Hitchcock.

**Stadiums**

The Yale Bowl (76071 D). 2700 w. A S C E, Pro—Dec., 1916. Discussion of Charles A. Ferry's paper.

The Yale Bowl (78314D). 2000 w. A S C E, Pro—April, 1917. Discussion of Charles A. Ferry's paper.

**Steel Frame**

Standard Unit Construction for Steel Frame Structures (78582 A). Ills. 80 w. Engr—Apr. 20, 1917. The design and applications.

Special Trusses of Rolled Beams Used in Walls of Sun Shipbuilding Plant (75371). Ills. 1000 w. Eng Rec—Dec. 16, 1916. High crane runways serve five launching ways.

The Progress of Steel Construction for Buildings (78036A). Ewart S. Andrews. 3000 k. Eng Rv—March 15, 1917. Reviewed from the historical standpoint.

Large Field Drilling and Riveting Job on Union Arcade Steelwork (78351). Ills. 900 w. Eng News-Rec—April, 1917. Details of work in Pittsburgh.

**Storehouse**

An Interesting Storehouse (80632 A). G. P. Dyer. Ills. 5000 w. U S Nav Inst, Pro—Aug., 1917. The Fore River storehouse and methods.

**Structural Engineering**

Things We Do Not Know About Structural Engineering (76560 B). W. M. Wilson, with discussion. 22 pp. West Soc Engrs, Jl—Dec., 1916. Behavior of structures. Importance of assumptions on which design is based.

**Structural Steel**

Proposed Complete Specifications for the Structural Steel Work of Buildings (75181). R. Fleming. 4500 w. Eng Rec—Dec. 9, 1916. Ignored details are definitely decided.

**Structural Work**

Adding Three Stories to Engineering Societies' Building (75921). Ills. 1700 w. Eng News—Jan. 11, 1917. Details.

**Stucco**

Durability of Stucco and Plaster Construction (76970). R. J. Wig, J. C. Pearson, and W. E. Emley. Ills. 72 pp. U S Bur Stds, No. 70—Jan. 31, 1917. Progress report containing results of investigations up to April, 1916.

**Subways**

Tunnel Work on Sections 8, 9, 10, and 11, Broadway-Lexington Avenue Subway, New York City (74791 D). 4000 w. A S C E, Pro—Nov., 1916. Continued discussion of Israel V. Werbin's paper.

New Center-Cut Method Avoids Vertical Side Face in Bad Rock on New York Subway Work (75464). Ills. 3500 w. Eng Rec—Dec. 28, 1916. Improved methods.

Tunnel Work on Sections 8, 9, 10, and 11, Broadway-Lexington Avenue Subway, New York City (76069 D). 1000 w. A S C E, Pro—Dec., 1916. Continued discussion of Israel V. Werbin's paper.

Tunnel Work on Sections 8, 9, 10 and 11 Broadway-Lexington Avenue Subway, New York City (78313D). 1800 w. A S C E, Pro—April, 1917. Continued discussion of Israel V. Werbin's paper.

**Subway Station**

Build Subway Station Beneath Philadelphia's Massive City Hall (78598). Ills. 2000 w. Eng News-Rec—May 10, 1917. Sectional construction and restricted space make work difficult.

**Swimming Bath**

Ferro-Concrete in Swimming Bath Construction (77411 A). Ills. 1500 w. Surv'r—March 2, 1917. Its application at Motherwell, N. B.

**Terminal Wall**

I-Beams, Forming Main Verticals of Bulkhead, Make Hard Driving Into Limestone (78599). Herbert D. Mendenhall. Ills. 2500 w. Eng News-Rec—May 10, 1917. Difficult work at Jacksonville. Methods adopted.

**Timber Joints**

Note on Bolted Timber Joints (75970 N). William Alexander. Ills. 1800 w. So Af Inst Engrs, Jl—Dec., 1916. Critical discussion of article by H. D. Dewell, in *Eng News* of July 20, 1916.

**Tornado Effects**

Tornado Effects on Structures in Three Recent Storms (81906). S. H. Ingberg. Ills. 3000 w. Eng News-Rec—Oct. 18, 1917. Suggestions as to the design of structures to resist high winds.

**Training Camps**

Plans for Army's Big Training Camps Made Public (79747). Ills. 1200 w. Eng News-Rec—July 7, 1917. System for handling and checking rush deliveries of vast quantities of materials.

**Trench Warfare**

German Methods of Trench Warfare (81370 C). 3500 w. Prof Mem—Sept.-Oct., 1917. Details of German trenches and methods of defence.

**Trilport**

La Restauration Du Pont De Trilport (74907 C + D). M. Wender. Ills. 3700 w. Pont Chaus Ann—March-April, 1916. Rebuilding a bridge over the Marne destroyed in the 1914 campaign.

**Tunnel Lining**

Placing Concrete in the Subway (79028). Ills. 1800 w. Mun Jl—May 31, 1917. Difficulties of introducing it in contracted spaces for tunnel lining. Work in N. Y. subways.

**Tunnels**

Driving of Tunnel Beneath English Channel Awaits British Parliament's Consent (74827). Ills. 3000 w. Eng Rec—Nov. 25, 1916. Project revived and definite plans discussed.

Le Tunnel Sous La Manche (74863 B). A. Dumas. Ills. 9000 w. Gen Civ—Oct. 21, 1916. Plan and location of project.

Lowering a Tunnel Under the Chicago River (74813). Ills. 3400 w. Eng News—Nov. 23, 1916. Van Buren St. tunnel, lowered to permit construction of Union Station.

Pneumatic Mixer Lines Railway Tunnel Under Traffic (74663). Ills. 1500 w. Eng News—Nov. 16, 1916. Sandy Ridge tunnel on the Carolina, Clinchfield & Ohio Ry.

The Channel Tunnel and Other Projects (74740 A). Ills. 2500 w. Engr—Nov. 3, 1916. Serial, 1st part. Reviews the proposals to connect England and France by other means than now used, especially the latest scheme. Consideration of plans and cost.

Die Eisenbahn-Tunnel der Schweiz von mehr als 2000 m. Länge (75564 B). Ills. 8500 w. Schweiz Bau—Nov. 25, 1916. Detailed comments on R. Winkler's paper before Internat. Engng. Congress, 1915.

Tunnel for Marseilles Canal Largest in the World (75029). Ills. 800 w. Eng News—Nov. 30, 1916. Rove tunnel in southern France.

Tunneling in Firm Clay with Compressed Air (75499). Ills. 2000 w. Eng News—Dec. 28, 1916. Operations at Cleveland, O., on Cuyahoga River tunnel.

Construction Methods for Rogers Pass Tunnel (76299 D). A. C. Dennis. Ills. 22 pp. A S C E, Pro—Jan., 1917. Tunnel on the Canadian Pacific Ry. in British Columbia.

Hawaiian Tunnel Driven by Japanese Labor Working Waist Deep in Water (76133). 2500 w. Eng Rec—Jan. 21, 1917. C. H. Kluegel describes difficulties caused by heavy inflows which were ultimately used as a source of power for construction.

Soft-Ground Tunnel Under Lake Union at Seattle Presents Many Difficulties (75690). Ills. 2000 w. Eng Rec—Dec. 30, 1916. Poling-board compressed air method. Grouting with hand pumps.

Tunnel Sous-Marin entre La France et L'Angleterre (76216 C + D). A. Moutier. Illus. 14000 w. Soc Ing Civ Fr—July-Sep., 1916. Comprehensive treatment of the problem of a tunnel under English Channel. Location, geology, etc.

New Methods in Tunneling in Variable Soft Ground (76572). L. G. Warren. Ills. 3600 w. Eng News—Feb. 8, 1917. New features in pneumatic tunneling recently used.

Construction Methods for Rogers Pass Tunnel (80661 D). 2500 w. A S C E, Pro—Aug., 1917. Continued discussion of A. C. Dennis' paper.

The Harlem River Subway Tunnel, New York (80392 A). Frank W. Skinner. Ills. & Plates. 1800 w. Engng—July 13, 1917. Serial, 1st part. Details of difficult construction and methods.

Methods Adopted in the Construction of Connaught Tunnel (77278 A). J. G. Sullivan. Ills. 1800 w. Corn C E—Jan., 1917. Tunnel in the Selkirk Mts. of British Columbia, five miles long.

Reconstruction of the Broadway Tunnel, Los Angeles, California (77390 A). Ills. 1200 w. Mun Eng—March, 1917. Interesting methods.

Subaqueous Tunneling at Its Worst (77975). Clifford M. Holland. 2000 w. Com Air Mag—April, 1917. Tubes being built under East River, N. Y. City.

Tunnel Under Hudson Designed for Vehicular Traffic (78339). Ills. 4000 w. Eng News-Rec—April 19, 1917. Tube recommended between New York and New Jersey.

Construction Methods for Rogers Pass Tunnel (78841 D). 1700 w. A S C E, Pro—May, 1917. Discussion of A. C. Dennis' paper.

Methods Employed in Construction of Fort Point Channel Rapid Transit Tunnel, Boston, Mass. (78696). Ills. 2500 w. Eng & Con—May 16, 1917. Details of construction methods as given in last annual report.

Submarine Tunnel at Boston, Mass. (81859 A). Ills. 2000 w. Engr—Sept. 14, 1917. Details of construction.

**Tunnel Ventilation**

Tunnel Ventilation (74892). 1200 w. Times Eng Supp—Oct. 27, 1916. Account of work at Woodhead Tunnel, near Sheffield, Eng.

**Underpinning**

Underpinning Trinity Vestry Building for Subway Construction (74793 D). 3500 w. A S C E, Pro—Nov., 1916. Continued discussion of H. deB. Parsons' paper.

Underpinning with Hollow Piles Driven with Point (74816). G. L. Knight. Ills. 1900 w. Eng News—Nov. 23, 1916. Two-story building underpinned to allow increase of height to four stories.

Build Concrete Slab Under Busy Railroad Station to Expedite Subway Construction (75931). Ills. 2000 w. Eng Rec—Jan. 13, 1917. Long Island R. R. underpins, Flatbush terminal, Brooklyn.

**Wharves**

Concrete Wharf Supports in Salt Water (74394). Thomas S. Williams. 3500 w. Can Engr—Nov. 2, 1916. Methods used in preparation of such supports, and precaution necessary.

Concrete Wharf Supports in San Francisco Harbor (80144 B). Thomas S. Williams. 2500 w. Prof Mem—July-Aug., 1917. Describes concrete piles and concrete cylinders, giving experiences.

**Woolworth Building**

Woolworth Building, New York (76142 A). Frank W. Skinner. Ills. and Plates. 3000 w. Engng—Jan. 5, 1917. Serial, 1st part. Detailed description of the construction, equipment, etc.

## IRRIGATION AND RECLAMATION

**Agriculture**

Irrigation and Drainage and Their Relation to Agriculture (78683 A). J. C. Wheelon. Ills. 2000 w. Utah Soc Engrs, Jl—March, 1917. Losses and damage due to excessive irrigation. Timely warning to all.

**Algeria**

L' Irrigation De La Plaine Du Chéliff (77602 C+D). M. Vielle. Ills. 5300 w. Pont Chaus Ann—Sept.-Oct., 1916. New irrigation works in Algeria.

**Artesian Water**

Artesian Water for Irrigation in Little Bitterroot Valley, Montana (74821 N). Oscar E. Meinzer. Ills. & Maps. 30 pp. U S Geol Surv, Water-supply paper 400-B—Nov. 22, 1916. Investigations and conclusions regarding the extent of the artesian-water supply.

**California**

Proposed Irrigation Project on Kings River, California (76679 A). 1500 w. West Eng—Feb., 1917. Includes construction of a dam containing 100,000 cu. yds. of concrete; total cost of project about $9,000,000.

Ground Water for Irrigation in the Morgan Hill Area, California (77405 N). W. O. Clark. Maps. 45 pp. U S Geol Surv, Water Sup paper 400-E—March 10, 1917. Investigations and report of conditions.

**Classification**

A complete Method for the Classification of Irrigable Lands (77327 D). 1200 w. A S C E, Pro—Feb., 1917. Discussion of F. H. Peters' paper.

**Colorado River**

Control of the Colorado River as Related to the Protection of Imperial Valley (78312D). 1200 w. A S C E, Pro—April, 1917. Continued discussion of J. C. Allison's paper.

**Conservation**

Address of Honorable Gifford Pinchot Before the Engineers Society of Pennsylvania (78930 A). 6000 w. Engr Soc Penn, Jl—Nov.-Dec., 1916. At Harrisburg, Pa., Dec. 15, 1916. On the principles of conservation as applied to water power.

**Dams**

The Case of the Standley Lake Dam. I. How Standley Lake Dam Was Built and the Story of the Slips. John E. Hayes. II. One Engineer's Opinion as to Why the Standley Lake Dam Sloughed. A. Lincoln Fellows (79016). Ills. 3500 w. Eng News-Rec—May 31, 1917. Abstract of paper before Colo. section of A. S. C. E., with portion of discussion on the failures.

The Arrowrock Dam Near Boise, Idaho, U. S. A. (79977 A). Ills. 1000 w. Engng—June 29, 1917. Account of recently completed dam for irrigation work in America.

**Drainage**

Big Drainage Project in North Carolina with Rural District Plan (77023). Ills. 3000 w. Eng News—March 1, 1917. Lake Mattamuskeet drained and 100,000 acres of land developed.

Construction Features and Methods in the Little River Drainage District (77495). B. F. Burns. Ills. 1700 w. Eng & Con—March 21, 1917. Outlines interesting features of work in Missouri.

Drainage Engineering (77284 B). John T. Stewart. 5500 w. Af Eng Soc Minn, Bul—1916. Problems of drainage.

Run-Off Computation for 70,000-Acre Storm-Water Drainage, St. Louis (77536). 1500 w. Eng News—March 22, 1917. Extracts from River des Peres report of W. W. Horner.

Drainage and the Drainage Engineer in the Middle West (78815 A). Clarke E. Jacoby. Ills. 2000 w. Kan Engr—1916-17. Drainage problems and their solution.

Bedrijfs en nitbreidingswerken der Haagsche rioleering (78855 B). F. C. J. Van Den Steen. Ills. 12000 w. Ingr—Apr. 14, 1917. New improvement project for drainage of a large tract at the Hague, Holland.

Drainage Problems in Saskatchewan (78749). Charles S. Cameron. Ills. 3500 w. Can Engr—May 17, 1917. How the capacities and locations of the drains are determined.

The Drainage of Irrigated Shale Land (79143 N). Dalton G. Miller and L. T. Jessup. Ills. 40 pp. U S Dept Ag, Bul 502—April 23, 1917. Principles and methods upon which the reclamation of this type of land depends.

Methods and Costs of Supervising Drainage Construction in the Little River Drainage District (78996). B. F. Burns. 2500 w. Eng & Con—May 30, 1917. Outlines methods adapted to the work to secure best results.

The Failure of a 30-in. Tile Drain at Albert Lea, Minnesota (79488 N). R. W. Crum. 9 pp. Am Soc Test Mat—June, 1917. Analysis of the failure of tile, with conclusions.

Flat Site at Chillicothe Camp Demands Careful Drainage (80585). Nathan C. Rockwood. Ills. 1800 w. Eng News-Rec—Aug. 16, 1917. Work at Camp Sherman.

The Main Drainage of Cairo (81189 N). Charles Carkeet James, with abstract of discussion. Map & Ills. 82 pp. Instn C E, No. 4160—Feb. 22, 1916. Detailed description of the work.

The Present Conditions of Arterial Drainage in Some English Rivers (81194 N). Richard Fuge Grantham, with abstract of discussion. Ills. 45 pp. Instn C E, No. 4184—April 4, 1916. History of work accomplished and improvements desirable.

The Subsidence of Muck Peat Soils in Southern Louisiana and Florida (81466 D). Charles W. Okey. Plate. 24 pp. A S C E, Pro—Sept., 1917. Reviews results of observations in England, and in drainage of Louisiana and Florida.

**Drain-Tile**

Tests Indicate Drain-Tile Beddings Increase Strength (77631). 2200 w. Eng Rec—March 24, 1917. Careful bedding raises strength 25 per cent. and some forms of concrete bedding 90 per cent.

**Egypt**

Public Works in Egypt (79435). 2000 w. Times Eng Supp—May 25, 1917. Progress last year in reclamation, drainage and canal construction.

**Everglades**

Reclaiming the Everglades of Florida (79861 B). Isham Randolph. Ills. 24 pp. Fkn Inst, Jl—July, 1917. Description, with outline of the immense drainage project, and experiences in surveying.

**Farm Drainage**

Internal Combustion Farm Drainage Machines (81182 A). Ills. 1000 w. Engng—Aug. 31, 1917. Detailed description of machines developed at Milwaukee, Wis.

The Drainage of Irrigated Farms (80122 N). R. A. Hart. Ills. 30 pp. U S Dept Ag—June, 1917. Methods described.

**Flood Control**

Réservoirs Pour L'Atténuation Des Crues (77600 C+D). M. Pigeaud. 12700 w. Pont Chaus Ann—Sept.-Oct., 1916. Reservoirs for flood control and for providing flow in dry periods.

Du Rôle Des Réservoirs (78259C+D). M. Wilhelm. 6000 w. Pont Chaus Ann —Nov.-Dec., 1916. Function of reservoirs in controlling stream flow.

**Flood Prevention**

Further Progress of the Miami Conservancy District of Ohio (78933 A). Kenneth C. Grant. Map. 5000 w. Engr Soc of Penn, Jl—Nov.-Dec., 1916. Progress of flood prevention work, and projected extensions.

**Floods**

See same heading under MECHANICAL ENGINEERING, *Hydraulic Machinery.*

**Flumes**

Rectangular Wooden Flumes (75433). J. C. Stevens. Ills. 3000 w. Eng News —Dec. 21, 1916. Methods of designing.

**Forests**

Forest Growth on Abandoned Agricultural Land (79851 A). P. L. Buttrick. Ills. 11 pp. Sci M—July, 1917. Reforestation, important old field types, etc.

**Goose Lake**

The Goose Lake Valley Irrigation System (75825). Kenneth A. Heron. Ills. 700 w. West Eng—Jan., 1917. To irrigate south-central Oregon.

**Hydrology**

Failure of Hydraulic Projects from Lack of Water Prevented by Better Hydrology (79141). Robert E. Horton. 2500 w. Eng News-Rec—June 7, 1917. Serial, 1st part. More complete stduy of stream yield, low frequency, dry weather evaporation, etc.

**Intensive Agriculture**

Overhead Irrigation at the Seabrook Farms, New Jersey (80423). 3000 w. Eng & Con—Aug. 8, 1917. Features of agricultural methods at Bridgeton, N. J.

**Land Erosion**

Prevention of the Erosion of Farm Lands by Terracing (78096N). C. E. Ramser. Ills. 40 pp. U S Dept Ag, Bul 512—April 5, 1917. Forms of erosion, methods of prevention; terracing, their maintenance and cultivation.

**Leasing System**

System of Leasing Irrigated Land on Trial Benefits Both Settlers and Company (77853). Robert A. Foster. 3000 w. Eng News-Rec—April 5, 1917. Plan used five years on Washington project.

**Little River**

Construction Methods and Machinery For Headwater Diversion System of Little River Drainage District (79986). B. F. Burns. Ills. 1200 w. Eng & Con—July 18, 1917. Heavy work in Missouri.

**Minidoka Project**

The Minidoka Irrigation Project (78104A). J. S. Longwell. Ills. 14 pp. Corn C E—March, 1917. Located in southern Idaho. Details of the work.

**New Mexico**

Irrigating Seventeen Thousand Acres of Municipal Land (77339). C. C. Cragin. Ills. 1100 w. Eng News—March 15, 1917. Project under way for Las Vegas, N. M.

**Pumping**

See same heading under ELECTRICAL ENGINEERING, *Power Applications.*

**Pumping Plant**

Large Reclamation Pumping Plant (76997 A). G. C. Noble. Ills. 4000 w. A S M E, Jl—March, 1917. Abstract of paper and discussion. Deals with drainage problems in California.

**Reclamation**

Flood Control Will Make Waste Land Factory Sites (75467). 1500 w. Eng Rec—Dec. 23, 1916. City Plan Commission of St. Louis reports on industrial development project.

Settlers with Small Farms Most Successful on United States Reclamation Projects (75180). 2500 w. Eng Rec—Dec. 9, 1916. Information from Sec. Lane's annual report.

Levee Construction and Electric Pumping for a Reclamation Project (81932). Ills. 1200 w. Elec Rev & Wes Elec—Oct. 20, 1917. Interesting features of work at Fort Madison, Iowa.

Louisiana Reclamation Project Grows to Seven Thousand Acres (81874). A. M. Shaw. Ills. 2000 w. Eng News-Rec—

Sept. 27, 1917. Construction difficulties on reclaimed land near New Orleans.

**Seepage**

Method of Reducing Seepage Losses in an Irrigation Canal Through Porous Shale (75312). J. H. Miner. 2000 w. Eng & Con—Dec. 13, 1916. Results.

Reduction of Seepage Losses in a Canal Through Porous Shale (75826). J. H. Miner. 1500 w. West Eng—Jan., 1917. Reduced by silting of the shale bottom and sides of the canal.

**Spraying**

Spray Irrigation (76886 N). Milo B. Williams. Ills. 39 pp. U S Dept Ag, Bul. 495—Feb. 14, 1917. Conditions under which spray irrigation is profitable, based on experience.

**Subirrigation**

Method of Subirrigation in the Sanford District, Florida (78595). Ills. 3300 w. Eng & Con—May 9, 1917. From bulletin of U. S. Dept. of Agri., prepared by F. W. Stanley.

**Washington**

$600,000 Washington Irrigation Project, Financed by Landowners, Completed in a Year (74825). J. C. Stevens. Ills. 4000 w. Eng Rec—Nov. 25, 1916. West Ocanogan system.

**Wells**

The Advantages of Large Wells for Irrigation and Methods of Driving 30 to 36-in. Wells (75314). Ills. 3500 w. Eng & Con—Dec. 13, 1916. From Bul. 141, issued by Am. Well Works, Aurora, Ill.

## MATERIALS OF CONSTRUCTION

**Aggregate**

Broken Old Concrete as Aggregate for Paving Foundation (78342). Clark R. Mandizo. 1500 w. Eng News-Rec—April 19, 1917. Practice in repairing streets of Kansas City.

Apparent Specific Gravity of Non-Homogeneous Fine Aggregates (79493 N). A. S. Rea. 4 pp. Am Soc Test Mat—June, 1917 Gives a satisfactory method which makes provision for the porosity of the grains.

**Asphalt**

The Asphalt Industry (75987 A). Ills. 3000 w. E Cb, Phila—Jan., 1917. Facts and figures concerning the asphalt situation.

L'Industrie De L'Asphalte (80747 B). A. Renouard. Ills. 4800 w. La Nat—July 28, 1917. Occurrence, properties and methods of obtaining asphalt, especially in Switzerland.

**Balsa Wood**

Investigation of the Properties of Balsa Wood (75421 A). R. C. Carpenter. Ills. 3000 w. Sib Jl Eng—Dec., 1916. Extracted from paper published in the May Pro. of A. S. C. E. Lightest wood known. Its uses.

**Bitumens**

The Effect of Exposure on Some Fluid Bitumens (80275 B). Charles S. Reeve and Richard H. Lewis. 2500 w. Jl Ind & Eng Chem—Aug., 1917.

**Brick**

Silica Brick and Some New Uses for Them (76724 A). Walter Gray. 9000 w. Met & Chem Eng—Feb. 15, 1917. Shows advantages of silica brick in many industrial operations.

Suggested Improvements in the Manufacture of Silica Brick (79485 N). C. E. Nesbitt and M. L. Bell. Ills. 15 pp. Am Soc Test Mat—June, 1917. Co-operation necessary; present method outlined; defects and how to reduce them.

**Building Material**

Production and Consumption of Building Material (81969). 2500 w. Eng & Con—Oct. 24, 1917. From report by Rolf Thelen, in bulletin of U. S. Dept. of Agriculture.

**By-Products**

Industrial Alcohol (80731). Ills. 3500 w. Times Eng Supp—July 27, 1917. Methods of production from wood, grain and town refuse or garbage.

**Canada**

The Production of Cement, Lime, Clay Products, Stone and Other Structural Materials in Canada During the Calendar Year 1915 (77259 N). John McLeish. 60 pp. Can Dept Mines—No. 423.

**Cement**

Some Slow Volume Changes in Portland Cement (75108 B). Edward D. Campbell. 1200 w. Jl Ind & Eng Chem—Dec., 1916. Results of tests.

United States Government Specifications for Portland Cement (76421). Ills. 40 pp. U S Bur Stds, No. 33—Jan. 18, 1917. Effective Jan. 1, 1917. Results of a joint conference.

High-Silicon Portland Cement (79499 N). A. W. K. Billings. 14 pp Am Soc Test Mat—June, 1917. Cites a case where economic conditions justified the use of high-silica cement, calling attention to its qualities and advantages under certain conditions.

Portland Cement (79064 A). G. A. Rankin. Ills. 4000 w. Sib Jl Eng—June, 1917. Account of early investigations in England and France. Test methods described.

A Preliminary Report on Blended Portland Cement (79810 N). Edgar S. McCandliss. 50 pp. Sch Mines & Met, Univ. of Missouri, Bul—Feb., 1917. Experimental study with results of tests.

Properties of the Calcium Silicates and Calcium Aluminate Occurring in Normal Portland Cement (79815 A). P. H. Bates and A. A. Klein. Ills. 36 pp. U S Bur Stds, Tech paper No. 78—June 9, 1917. Investigations and conclusions.

The Effect of Sulphide on Cement (81580 N). J. C. Witt. Plate. 16 pp. Phil Jl Sci—Nov., 1916. Work undertaken to obtain data on the concentration of sulphide which may be present without injury; and effect on the setting time and tensile strengths of various cements.

**Cement Block**

Nouvelle Brique En Ciment (79425 B). G. Lanorville. Ills. 1500 w. La Nat—May 26, 1917. New design of interlocking, reinforced cement block used for levee and revetment work. Methods of manufacture.

**Cement Plant**

Edison Portland Cement Plant Remodeled (77046). Percy H. Wilson. Ills. 1500 w. Eng Rec—March 3, 1917. Combination ball-and-tube mills and other machinery installed.

**Cements**

Plastic Cements (77353 A). J. B. Barnitt. 3000 w. Met & Chem Eng—March 15, 1917. Data on the correct mixtures and proper applications.

Plastic Cements (80431 A). J. B. Barnitt. 1800 w. Mech Wld—July 27, 1917. Methods of application, materials, etc.

**Ceramics**

The Use of Ceramic Products in the Embellishment of Buildings (76434 B). Claude Bragdon. 3000 w. Archt Forum—Jan., 1917. Their proper use.

**Clay**

Clay-Working Industries and Building Operations in the Larger Cities in 1915 (76315 N). Jefferson Middleton. 68 pp. U S Geol Surv, II : 30—Dec. 22, 1916. Statistics on clay-working industries and clay-mining.

Some Relations Between Raw Clay and Properties of Clay Products (75950 A). H. Ries. Ills. 1200 w. Sib Jl Eng—Jan., 1917. Defects in paving brick and their causes.

Practical Handling of Iowa Clays with Application of Ceramic Principles (75382 N). Homer F. Staley and Milton F. Beecher. 45 pp. Iowa St Col, Pro, Bul. 43—Oct. 10, 1915. Prospecting and testing (81224 D). H. Ries and Y. Oinouye. during burning, etc.

A Study of the Microstructure of Some Clays in Relation to Their Period of Firing; manufacture of clay wares; changes Ills. 14 pp. A I M E, Bul—Sept., 1917. Changes in firing; relation between temperature and change in constitution.

**Colloids**

Colloids and Their Occurrence in Trinidad Lake Asphalt (75384 A). J. S. Miller, Jr. 1800 w. E Cb Balt, Jl—Dec., 1916. Investigations and simple explanations.

**Concrete**

The Effect of the Use of Salt Water for Gaging Concrete on the Life of the Reinforcing Steel Imbedded Therein (75385 A). J. L. Harrison. Ills. 3000 w. E Cb Balt, Jl—Dec., 1916. Its use in Philippine Islands is dangerous.

Analysis of Chicago By-Law for Flat Slabs (76117). William Worth Pearse. 1500 w. Can Engr—Jan. 18, 1917. Recent tests show the Chicago code is conservative.

Final Report of the Special Committee on Concrete and Reinforced Concrete (76065 D). 50 pp. A S C E, Pro—Dec., 1916.

Tests of Concrete Specimens in Sea Water, at Boston Navy Yard (76061 D). R. E. Bakenhus. Ills. 30 pp. A S C E, Pro—Dec., 1916. Twenty-four specimens immersed seven years to determine effect of special compositions.

Water the Chief Factor in the Making of Good Concrete (75688). Nathan C. Johnson. Ills. 5000 w. Eng Rec—Dec. 30, 1916. Explanation of defects due to excessive use of water.

The Disintegration of Concrete in Railway Tunnels (76681 A). Charles A. Newhall, with discussion by H. K. Benson. Ills. 17 pp. Pacific N-W Soc Engrs—Oct.-Nov., 1916. Conditions under which concrete is likely to disintegrate.

Concrete Structures Wrecked by Intense Heat at Cereal-Plant Fire Causing $2,000,000 Damage (77851). Ills. 2000 w. Eng News-Rec—April 5, 1917. Quaker Oats Co. loses nine buildings.

Concrete Consistency Measured by Simple Field Test (78509). Harold A. Thomas. 1800 w. Eng News-Rec—May 3, 1917. Methods of using "heap test."

Discussion on Final Report of the Special Committee on Concrete and Reinforced Concrete (78840 D). 28 pp. A S C E, Pro—May, 1917. Continued discussion.

Tests of Concrete Specimens in Sea Water at Boston Navy Yard (78837 D). Ills. 2000 w. A S C E, Pro—May, 1917.

Continued discussion of R. E. Bakenhus' paper.

Effect of Hydrated Lime on Essential Qualities of Concrete (79358 A). Norman G. Hough. 2500 w. E Cb Balt, Jl—June, 1917. Opinions concerning its value.

Final Report of the Joint Committee on Concrete and Reinforced Concrete (79470 N). 60 pp. Am Soc Test Mat—June, 1917. Recommendations for standard practive.

The Economical Proportions for Portland-Cement Mortars and Concretes (79490 N). J. A. Kitts. 15 pp. Am Soc Test Mat—June, 1917. Presents data defining the limits for economical proportions.

The Effects of Grading of Sands and Consistency of Mix Upon the Strength of Plain and Reinforced Concrete (79513 N). L. N. Edwards. Ills. 55 pp. Am Soc Test Mat—June, 1917. Describes methods used in a series of experimental tests.

The Effect of Sea Water on Some of the Concrete Structures in the Philippine Islands. (79597). J. L. Harrison. Ills. 2000 w. Eng & Con—June 27, 1917. Record of structures examined.

Discussion on Final Report of the Special Committee on Concrete and Reinforced Concrete (80670 D). Ills. 14 pp. A S C E, Pro—Aug., 1917. Continued discussion.

Concrete in War (80730). 2000 w. Times Eng Supp—July 27, 1917. Effect of gun fire on concrete structures. Experience gained in present war.

Tests of Concrete Specimens in Sea Water at Boston Navy Yard (80663 D). 1800 w. A S C E, Pro—Aug., 1917. Continued discussion of R. E. Bakenhus' paper.

The Effect of Hydrated Lime on the Compressive Strength of Concrete (80248 N). Warren E. Emley and S. K. Kaczorowski. 500 w. Nat'l Lime Mfrs Assn—June, 1917. Investigations and results described.

Discussion on Final Report of the Special Committee on Concrete and Reinforced Concrete (81472 D). 500 w. A S C E, Pro—Sept., 1917.

Note on the Determination of Voids in Concrete (81191 N). Arthur James Hillman. 400 w. Instn C E, No. 4149—1916. Measurements made.

Discussion on Final Report of the Special Commitee on Concrete and Reinforced Concrete (81998 D). 18 pp. A S C E. Pro—Oct., 1917. Continued from September.

Plain Concrete in Sea Water Must Be Protected Against Abrasion (81710). Rudolph J. Wig and Lewis R. Ferguson. Ills. 2500 w. Eng News-Rec—Oct. 4, 1917. Second of five articles on the subject.

The Expansion and Contraction of Concrete and Concrete Roads (82049 N). A. T. Goldbeck and F. H. Jackson, Jr. Ills. 30 pp. U S Dept Ag, Bul. 532—Oct. 13, 1917. Laboratory measurements and results; road measurements and results.

Uses of Concrete in Coal Mines (81634). Ills. 1500 w. Cl Age—Oct. 6, 1917. Applications to mine work.

What Is the Trouble With Concrete in Sea Water? (81868). Rudolph J. Wig and Lewis R. Ferguson. Ills. 2000 w. Eng News-Rec—Sept. 20, 1917. Serial, 1st part. First of a series on the deterioration of concrete in sea water.

**Concrete Mixing**

Concrete-Mixer Boat for Ohio River Locks (76451). A. W. Kreamer and Gregory M. Dexter. Ills. 3000 w. Eng News—Feb. 1, 1917. New barge mounting steel tower, with storage bins.

Mixing Concrete Dry at a Central Plant (76452). H. F. LaBrecque. Ills. 1200 w. Eng News—Feb. 1, 1917. First prize article.

**Concrete Piles**

History and Present Status of the Concrete Pile Industry (78152 B). Charles R. Gow. Ills. 58 pp. Bos Soc C E—April, 1917. Development. Two types of piles.

**Corrosion**

Scheur en roestvorming in bruggen van gewapend beton (76225 B). N. C. Lambrechtsen. Illus. 1900 w. Ingr—Dec. 23, 1916. Investigation of corrosion in reinforced concrete bridges in the railway district near Breslau.

Die Verhinderung des Rostens der Eiseneinlagen im Eisenbeton (77551 B). B. Zschokke. Ills. 2300 w. Schweiz Bau—Feb. 10, 1917. Serial, 1st part. A study of corrosion of steel used in concrete.

**Derricks**

Failure in Derrick-Boom Caused by Dry Rot (78623 A). Henry Blood. Ills. 1000 w. West Eng—May, 1917. An accident at Portland, Oregon.

**Dry Rot**

Dry Rot: Its Causes and Prevention (80380 A). E. J. Goodacre. Read before Instn. Munic. & Co. Engrs. 2200 w. Surv'r—July 6, 1917. Prevention of destruction of timber by fungi.

**Engineering Materials**

The Standardization of Engineering Materials (78827 A). Sir John Wolfe Barry. James Forrest lecture before Inst. of Civ. Engrs. Ills. 7500 w. Engng—

May 4, 1917. The work of the Engineering Standards Committee and the influence on British prosperity.

The Standardization of Engineering Materials, and its Influence on the Prosperity of the Country (81196 N). John Wolfe Barry ("James Forrest" lecture, 1917). 30 pp. Instn C E—May 2, 1917. The past, present, and future work of the Engineering Standards Committee.

**Explosives**

Can Explosives be made at Sewage Works? (75891 A). Dr. S. Rideal, with discussion. 4500 w. Surv'r—Dec. 22, 1916. Directions in which useful work can be undertaken.

Testing the Strength of Explosives (75871 N). J. A. Campbell. 2200 w. Chem, Met, & Min Soc of S Af, Jl—Oct., 1916. Apparatus used.

**Fertilizers**

Sulphur Fertilization for Cotton (81088). Courtenay De Kalb. 3500 w. Mfrs' Rec—Sept. 13, 1917. Beneficial effects, and necessary conditions.

**Fire Damage**

Quartz-Gravel Aggregate Blamed for Excessive Fire Damage (76132). Ills. 1200 w. Eng Rec—Jan. 20, 1917. Reinforced-concrete warehouse fire at Far Rockaway, N. Y.

**Fireproofing**

The Combustion and Fireproofing of Wood: Some Minute Reactions (74736 A). James Scott. Ills. 1500 w. Ry Engr—Nov., 1916. How wood is destroyed by fire and the most efficatious methods of fireproofing.

**Floor Material**

Floor Filler Tile. Made of Structolite Gypsum (76984). Ills. 700 w. Eng & Con. Feb. 28, 1917. Its use and tests.

**Forestry**

Forestry and the Future Timber Supply (74611 A). N. M. McNaughton. Ills. 2000 w. Engr Soc Penn, Jl—Sept., 1916. Importance of careful treatment of forest areas.

**Forests**

Les Forêts Du Canada (81396 B). G. C. Piché. 9000 w. Rev Tri Can—Aug., 1917. Species of trees, their extent and geographical distribution in the Dominion of Canada.

**Galvanized Iron**

Galvanized-Iron Roofing in the Philippines (77966 N). Angel S. Argüelles. 3500 w. Phil Jl Sci—July, 1916. Requirements for satisfactory service.

**Glass**

The Window Glass Machine (77700 B). Robert Linton, with discussion. Ills. 30 pp. Engr Soc W Penn—Feb., 1917. History and description of process of manufacture of window glass.

See same heading under MECHANICAL ENGINEERING, *Materials of Construction.*

**Grading**

Grading in the Cement, Coal and Cork Industries (75350 A). Edward S. Wiard. 2500 w. Met & Chem Eng—Dec. 15, 1916.

**Graphite**

Graphite: Its Origin, Formation and Action (78824 A). James Scott. Ills. 1500 w. Ry Engr—May, 1917. Its value as a lubricant.

**Gravel**

Grading of Crushed Stone and Gravel, Feldspar, Fireworks and Flour (78024 A). Edward S. Wiard. 2000 w. Met & Chem Eng—April 15, 1917. Concentration methods used in preparing these commodities for market.

Utilizing "Oversize" to Increase Output of Small Gravel Plants (79326). Ills. 1500 w. Eng & Con—June 20, 1917. Work of small stone crushers.

**Gunite**

Hand and Machine Placed Mortars (75666). Bryan Cheves Collier. Ills. Abstract of address before Can. Soc. of Civ. Engrs. 3500 w. Can Engr—Dec. 28, 1916. Many uses to which "gunite" can be applied.

**Lime**

The Effect of Exposure on Commercial Limes (77152 B). J. Clyde Whetzel. 2000 w. Jl Ind & Eng Chem—March, 1917. Investigates the effect of "air-slaking."

Lime on the Farm (77958). M. L. Fearnow. 2000 w. Nat Lime Mfrs Assn —March, 1917. The need of lime and how to detect it.

Lime on the Farm (78056 N). M. L. Fearnow. 15 pp. Nat Lime Mfrs Assn—March, 1917. Forms of agricultural lime and their applications.

Lime on the Farm (79337 N). M. L. Fearnow. 16 pp. Nat'l Lime Mfrs Assn —April, 1917. Origin of the soil and soil chemistry.

Report of Committee C-7 on Lime (79510 N). 4 pp. Am Soc Test Mat—June, 1917. Proposed tentative specifications for Masons' hydrated lime.

The Standard Lime Barrel and Package (79519 N). F. S. Holbrook. 12 pp. Nat'l Lime Mfrs' Assn—June, 1917. Discussion of the Standard Lime Barrel law.

Limestone and Lime (80241). G. F. Loughlin. 3300 w. U S Geol Surv—Bul. 666-R. Production, imports, and exports. Military importance.

Calcining Lime in Rotary Kilns from the Quarry to the Finished Product (81532 N). A. T. Wood. 6 pp. Nat'l

Lime Mfrs.' Assn—July, 1917. An account of recent progress in the manufacture of lime.

**Lumber**

How to Buy Pattern Lumber Economically (77094). H. Cole Estep. 2000 w. Fndry—March, 1917. How specialists can help.

The Resawing of Lumber (78518). D. C. Curtis. 1800 w. Ry Age Gaz—May 4, 1917. Methods of reclaiming lumber. Economies suggested.

Determinants of Lumber Prices (79120 N). George A. Stephens. 16 pp. Am Ec Rev—June, 1917. Influences which cause the variation of the lumber price curve.

**Lumber Storage**

Storage Yards for Railway Lumber (81331). 3500 w. Ry Rev—Sept. 22, 1917. From committee report to Ry. Storekeepers' Assn. Suggestions for the layout of yards, methods of piling, etc.

**Materials**

Materials (80469 N). A. Wright. Ills. 3500 w. Per-Way Instn, Jl—April, 1917. Suggestions for practical tests in inspecting, ordering or using materials.

**Masonry Failures**

Historic Failures of Masonry Structures (77701). Horace R. Thayer. Address of retiring chairman, with correspondence. Ills. 49 pp. Eng Soc W Penn—Feb., 1917. Types, their strength and weaknesses.

**Mine Timbers**

Some Causes of Decay of Timbers in Coal Mines (75650 A). J. Mitchell. From paper before Midland Inst. of Min., Civ., & Mech. Engrs.—Dec. 15, 1916. 3000 w. Colly Gdn—Dec. 15, 1916. Mine fungi, the infection by spores, combative and preventive measures, etc.

**Mortar**

Influence De L'Argile (78258 C + D). M. Laclotre. Ills. 4300 w. Pont Chaus Ann—Nov.-Dec., 1916. Account of tests to determine effect of clay in sand upon strength of mortar.

The Properties of Cement-Lime-Sand Mortars (79486 N). Warren E. Emley. Diagrams. 11 pp. Am Soc Test Mat—June, 1917. The more important properties and how affected by changes in proportions.

**Nitrates**

Studies on the Phenoldisulfonic Acid Method for Determining Nitrates in Soils (77153 B). Charles W. Davis. 4500 w. Jl Ind & Eng Chem—March, 1917. Old and new methods, with bibliography.

**Nitrogen**

The Organic Nitrogen Compounds of Soils and Fertilizers (77468 B). Elbert C. Lathrop. 19 pp. Fkn Inst, Jl—March, 1917. Serial, 1st part. A study of soils.

**Paints**

Practical Tests of Freight Car Paint (75952 A). G. S. Evans. Ills. 1200 w. Ry Mech Engr—Jan., 1917. Methods.

Notes on Prepared Paints for Metal Surfaces (80525 A). Henry A. Gardner. 2500 w. Af Eng Soc of Minn, Bul—Aug., 1917. Discusses various pigments used as protective coatings.

**Paper**

Some Observations on the Influence of Humidity on the Physical Constants of Paper (77150 B). Otto Kress and Philip Silverstein. Part of a thesis for the degree of Chem. Engr. Ills. 3500 w. Jl Ind & Eng Chem—March, 1917. Tests of commercial papers, and results.

**Piling**

Teredo Destroys Improperly Treated Piles (81772). Dr. Herman von Schrank. Ills. 1000 w. Ry Age Gaz—Oct. 12, 1917. Inadequate injection of creosote.

**Potash**

Concentrated Potash a By-product of Cement Mill (79601). Ills. 1800 w. Eng News-Rec—June 8, 1917. Gives 6 lbs. of potash per barrel of clinker.

The Nature of Cement Mill Potash (79753 B). R. J. Nestell and E. Anderson. Ills. 4500 w. Jl Ind & Eng Chem—July, 1917. Analysis of various dusts, effect of soil admixture, etc.

The Possibilities of Developing an American Potash Industry (79895 A). Richard K. Meade. 10000 w. Met & Chem Eng—July 15, 1917. Methods employed for obtaining potash.

See same heading under MINING AND METALLURGY, *Minor Minerals.*

**Preservative Coatings**

Report of Committee D-1 on Preservative Coatings for Structural Materials (79474 N). 40 pp. Am Soc Test Mat—June, 1917. Recommendations, and reports from sub-committees on testing paint vehicles; on linseed oil; analysis of paint materials, etc.

**Reforestation**

Reforestation as a Solution of South's Cutover Land Problem (80149). Stanley C. Arthur. Ills. 1800 w. Mfrs' Rec—July 26, 1917. Urging the second growth of timber.

**Reinforced Concrete**

Bad Effects Resulting from the Use of Salt Water in Reinforced Concrete Structures Built in Tropical Countries (74807). J. L. Harrison. Ills. 3000 w. Eng & Con—Nov. 22, 1916. Investigations and conclusions.

The Progress of Reinforced Concrete (75873 A). Ewart S. Andrews. 2200 w. Eng Rv—Dec., 1916. Historical review and estimate of future use.

Quaker Oats Fire Wrecks Flat-Slab Warehouse (76880). Ills. 4500 w. Can Engr—Feb. 22, 1917. Structure ruined by extremely high temperatures.

Reinforced Concrete: Its Application to Pit Props (80792 A). W. A. Machin. Read before Nat. Assn. of Col. Mgrs. 1800 w. Ir & Cl Trds Rev—Aug. 10, 1917. Describes the Keedon prop, and states the recognized advantages of concrete props.

Reinforced Concrete Pillars (80965 A). Ewart S. Andrews. 2500 w. Eng Rev—Aug., 1917. Serial, 1st part. A constructive criticism of the London County Council regulations.

**Rock Crushing**

An Investigation on Rock Crushing Made at McGill University (76590 D). John W. Bell. 1500 w. A I M E, Bul—Feb., 1917. Laboratory experiments with different specimens.

**Roofs**

Reinforced-Gypsum Roof Decks a Modern Development in the Structural Field (75375). Virgil G. Marani. Ills. 1800 w. Eng Rec—Dec. 16, 1916. Theoretical formulæ proposed for new combination of materials.

**Rubber**

Rubber (75651 A). 2500 w. Engng—Dec. 15, 1916. Reviews recent research work and the present condition of the rubber industry.

The Rubber Situation (75959 A). Andrew H. King. Ills. 4500 w. Met & Chem Eng—Jan. 15, 1917. Need of an American rubber industry and how to establish it.

Investigation of the Quality of Plantation Rubber Conducted Under the Ceylon Rubber Research Scheme (78817 N). 70 pp. Imp Inst, Bul—Oct.-Dec., 1916. Investigations dealing with the effect of different methods upon the mechanical properties of vulcanized rubber.

Some Present Needs of the British Rubber Industry (78818 N). Wyndham R. Dunstan. 2500 w. Imp Inst, Bul—Oct.-Dec., 1916. Need of research in connection with this industry.

Report of Committee D-11 on Rubber Products (79480 N). 7 pp. Am Soc Test Mat—June, 1917. Specifications for air-line hose for pneumatic tools.

Rubber and the War (81309 A). Andrew H. King. Ills. 4000 w. Met & Chem Eng—Sept. 15, 1917. Its use for tires, for clothing and rubber goods, for protection from moisture, gas, etc.

**Sand**

Essaie De Divers Sables Pour Mortiers (76263 C + D). R. Feret. 1700 w. Pont Chaus Ann—July-Aug., 1916. Tests on mortar sands twenty years after.

Colorimetric Test for Organic Impurities in Sands (77496). 1200 w. Eng & Con—March 21, 1917. Abstract from circular by Duff A. Abrams and Oscar E. Harder. Methods and data.

**Sewer Pipe**

Report of Committee C-4 on Clay and Cement Sewer Pipe (79471 N). Ills. 30 pp. Am Soc Test Mat—June, 1917. Proposed tentative specifications.

**Slate**

Une Industrie Minière En Ardenne Envahie (74921 G). A. Renoyard. Ills. 3100 w. La Nat—Nov. 11, 1916. Quarrying and shipping methods in France.

**Standardization**

The Standardization of Engineering Materials and Its Influence on the Prosperity of the Country (79290 A). John Wolfe Barry. James Forrest lecture before Instn. of Civ. Engrs. (Abridged.) 5000 w. Eng Rev—May 15, 1917. The work of the Engineering Standards Committee and the subject in general.

**Steel Alloys**

High-Speed Steel Alloys (75233 A). 1800 w. Engng—Nov. 24, 1916. Editorial on new works for producing tungsten powder in England made necessary by the war.

**Stone**

Stone in 1915 (75996 N). G. F. Loughlin. 82 pp. U S Geol Surv, II: 28—Dec. 27, 1916. Statistical data, with distribution and qualities.

**Timber**

The Important Piling Timbers of Australasia (75134 A). A. K. Armstrong. 5000 w. Engng—Nov. 17, 1916. Summary of information concerning these woods.

Notre Domaine Forestier (75574 B). H. Roy. 6300 w. Rev Tri Can—Nov., 1916. Description of, and suggestions for conserving the forests of Quebec and attainable results.

Timber Decay and Its Growing Importance (75828). C. J. Humphrey. Ills. 2000 w. Ry Age Gaz—Dec. 15, 1916. Character of organisms that destroy wood, and the preventive measures.

Protection of Our Forests (76010 A). George H. Wirt. Ills. 2500 w. Engr Soc Penn, Jl—Oct., 1916. Necessity of protection.

Canadian Woods for Structural Timbers (77840). 1800 w. Can Engr—April 5, 1917. Abstracted from publication of Forestry Branch, Dept. of Interior.

Government and Timber Supplies (78203 A). 4500 w. Colly Gdn—April 5, 1917. Discussions at meeting of the English Forestry Assn.

Timber Decay and Its Growing Importance to the Engineer and Architect (78107 B). C. J. Humphrey, with discussion. Ills. 26 pp. West Soc Engrs, Jl—Feb., 1917. Causes of decay, and its control.

Report of Committee D-7 on Timber (79477 N). Ills. 25 pp. Am Soc Test Mat—June, 1917. Study of wooden paving blocks and timber preservatives, with proposed specifications.

The Recent Industrial and Economic Development of Indian Forest Products (79335 A). R. S. Pearson, with discussion. 4500 w. Roy Soc Arts, Jl—May 25, 1917. Serial, 1st part. Some of the industries established.

The Woodlot: A Problem for New England Farmers (80856 A). James W. Toumey. Ills. 2500 w. Sci M—Sept., 1917. Advantages of intensive management.

**Timber Preservation**

Notes on Preservation of Wood—Some Microscopical Features (76186 A). James Scott. Ills. 1500 w. Ry Engr—Jan., 1917. Processes.

Report of Committee on Plant Operation (76008 N). 14 pp. Am Wd Pres Assn—Jan., 1917. Work of a wood-preserving plant.

Report of Committee on Preservatives (76006 N). 65 pp. Am Wd Pres Assn—Jan., 1917.

Timber Treating Plant of the Boston Elevated Ry. (75963). E. W. Bright. Ills. 800 w. Ry Rev—Jan. 13, 1917. A modern creosoting plant.

Preservation of Timber from Boring Organisms (77247 A). Ills. 1200 w. Engng—Feb. 23, 1917. Results from Australian tests.

**Timber Specifications**

Report of Committee on Specifications for the Purchase and Preservation of Treatable Timber (76274 N). 13 pp. Am Wd Pres Assn—Jan., 1917. Recommendations.

**Timber Treating**

Louisville & Nashville Timber Treating Plant (75149). Ills. 1800 w. Ry Age Gaz—Dec. 8, 1916. Features of a recently rebuilt plant.

**Waterproofing**

Report of Committee D-8 on Waterproofing (79509 N). 10 pp. Am Soc Test Mat—June, 1917. Proposed tentative specifications for asphalt; for primer for use with asphalt; for coal-tar pitch; for creosote oil for priming coat with coal-tar pitch.

Some Practical and Technical Tests on Waterproofing Materials (81458 B). Joseph Rosenzweig. Ills. 4000 w. Mun Engrs Jl—Sept., 1917. Information derived from tests made in connection with work on the Dual Subway system of New York.

**Wood**

Research in Timber (76910 A). 950 w. Nature—Feb. 8, 1917. Abstract of an address by Prof. Groom to the Timber Trade Federation of Great Britain.

See Forests.

**Wood Blocks**

Treatment and Inspection of Creosoted Wood Blocks (81257 A). W. R. Goodwin. 6 pp. Af Eng Socs of Minn, Bul—Sept., 1917. Reviews process of manufacture.

**Wood Decay**

The Chemistry of Wood Decay (77151 B). Robert E. Rose and Martin W. Lisse. 2200 w. Jl Ind & Eng Chem—March, 1917. Serial, 1st part. Analytical study.

**Wood Preservation**

Report of Committee XVII.—On Wood Preservation (77515 N). Ills. 38 pp. A R E A, Bul—March, 1917. Specifications for creosote oil analysis, water sampling in creosote oil, tests, etc.

Practical Wood Preservation (79777). W. E. Hoyt. Ills. 1500 w. Cl Age—July 7, 1917. Methods of treating.

Wood Preservation (81253 C). Ills. 13 pp. Am Ry Eng Assn, Bul—July, 1917. Specifications for creosote oil analysis.

Minority Report of Sub-Committee B of Committee on Preservatives (76275 N). 10 pp. Am Wd Pres Assn—Jan., 1917. Also Reply to Minority Report.

Boston Elevated Completes Pressure Wood Preserving Plant (74723). Edgar W. Bright. Ills. 1500 w. Elec Ry Jl—Nov. 18, 1916. Pressure plant treating 7,000,000 feet of timber a year.

**Wood Waste**

Utilization of Lumber-Mill Waste (76393). R. L. Watts. Ills. 1500 w. Power—Jan. 30, 1917. How one company uses all its refuse in the generation of steam.

## MEASUREMENT

**Arch Stresses**

Pouts A Arcades, Système Vierendeel (74864 B). F. Drouhet. Ills. 2600 w. Gen Civ—Oct. 21, 1916. Mathematical. New method of approximate determination of arch stresses.

**Asphalts**

A Method for Studying the Effects of Temperature Upon the Physical Condition of Asphalts, Waxes, etc. (79489 N). J. A. Capp and F. A. Hull. Ills. 7 pp. Am Soc Test Mat—June 1917. Details.

**Beams**

Momenten in betonbalken (74855 B). W. J. M. Van De Wijnpersse. Ills. 1900 w. Ingr—Oct. 7, 1916. Stresses in concrete beams. Mathematical.

Elastic-Weight Theory Graphically Applied to Continuous Beams (77236 A). Cyril Provo Hubert. 900 w. West Eng—March, 1917. Graphical solution of stresses, illustrated by application to problems of design.

I. Transformed Section Analysis of Reinforced Concrete Beams. J. H. Cissel. II. Graphical Analysis of Complex Reinforced Concrete Beams. W. S. Wolfe (77633). Ills. 1200 w. Eng Rec—March 24, 1917. Investigations and official methods.

Reinforced Concrete Beams Reinforced for Compression (79134 A). Leonard C. Urquhart. 500 w. Cork C E—April, 1917. Diagrams covering the general requirements, with the theory leading up to them.

The Graphical Determination of the Moment of Inertia of Complex Beam Sections (79596). W. S. Wolfe. Diagrams. 800 w. Eng & Con—July 27, 1917. Illustrated by examples.

Alignment Diagrams for Determining the Bending Moments of Reinforced Concrete Beams (81358 A). 400 w. Engng—Sept. 7, 1917. Graphical representations of the formulæ given in the London County Council Regulations.

A Graphical Method of Determining Bending Moments in Continuous Beams (81029). 1000 w. A A Wkly—Sept. 10, 1917. Diagrams and explanation.

Diagrams for Continuous Beams of Unequal Spans (81930 B). Frank S. Bailey. Ills. 13 pp. Bos Soc C E, Jl—Oct., 1917. Diagrams and descriptions.

**Bituminous Materials**

A New Consistency Tester for Viscous Liquid Bituminous Materials (79500 N). Prévost Hubbard and F. P. Pritchard. 16 pp. Am Soc Test Mat—June, 1917. Details of instrument and its use.

**Bridges**

Das Versuchswesen in der Praxis des Eisen-und Eisenbetonbaues (82083 B). F. Hübner. Ills. 4200 w. Schweiz Bau—Oct. 6, 1917. Serial, 1st part. Measurements on deflection of steel and reinforced concrete structures.

**Building Tests**

Results of Extensometer Measurements in a Reinforced Concrete Building Over a Period of One Year (78241). Ills. 3300 w. Eng & Con—April 25, 1917. Details of tests, and conclusions.

**Circle Diagram**

A New Construction for the Circle Diagram (80441 N). G. M. Adams, with introduction by W. Buchanan. 10 pp. S Af Instn E E, Trans—May, 1917. Properties of the circle diagram and method of construction.

**Columns**

Formulas for the Three-Piece Frame and Eccentrically Loaded Columns (76821). Alfredo C. Janni. Ills. 1900 w. Eng News—Feb. 22, 1917.

Tests of Hooped Concrete Columns with Cast Iron Cores (76983). Ills. 2000 w. Eng & Con—Feb. 28, 1917. Abstract of paper before Am. Concrete Inst. Tests and results.

The Euler Formula and Exact Theory of Columns (76981). J. H. A. Bralitz. 1200 w. Eng & Con—Feb. 28, 1917. Serial, 1st part. Critical discussion of earlier article by David Kaplan.

Graphical Determination of the Stresses in Eccentrically Loaded Reinforced Concrete Columns (78240). W. S. Wolfe. Ills. 1200 w. Eng & Con—April 25, 1917. The method and its advantages.

Graphical Analysis of Stresses in Complex Column Sections (78832). W. S. Wolfe. Ills. 1000 w. Eng & Con—May 23, 1917. Gives graphical solution and states its advantages.

**Column Tests**

Important Series of Steel Column Tests Establishes Principles of Strength (79603). Ills. 3000 w. Eng News-Rec—June 28, 1917. Tests at Bureau of Standards. Strength found to depend on the compressive yield-point of the steel.

**Compression Members**

Curves for Angles as Compression Members (80674). E. Dow Gilman. 800 w. Eng & Con—Aug. 32, 1917. Methods of choosing a section to carry a given load.

**Concrete**

Tests of Concrete Specimens in Sea Water at Boston Navy Yard (77328 D). 4000 w. A S C E, Pro—Feb., 1917. Discussion of R. E. Bakenhus' paper.

Effect of Rate of Application of Load on the Compressive Strength of Concrete (79517 N). D. A. Abrams. 9 pp. Am Soc Test Mat—June, 1917. Methods and results.

Tests of Concrete Slabs to Determine the Effect of Removing Excess Water Used in Mixing (79518 N). A. N. Johnson. Ills. 6 pp. Am Soc Test Mat—June, 1917. Results show that the slabs finished with the roller averaged 20 per cent. increase in transverse strength.

Test of a Flat Concrete Tile Dome Reinforced Circumferentially (79598). W. A. Slater and C. R. Clark. Ills. 3000 w. Eng & Con—June 27, 1917. Abstract of paper read before Am. Concrete Inst.

**Cuba**

Cartografia de Cuba y Proyecto de organización de un servicio geográfico en el Ejército (74867 A). A. G. Del Real. Ills. 13,000 w. Soc Cub Ing Rv—Sept., 1916. Plan for organization of a map making division under army direction.

**Culverts**

Tests of Corrugated Culverts (75645 A). George L. Fowler. Ills. 3000 w. Ry Gaz—Dec. 15 ,1916. Serial, 1st part. Details of practical tests, with results.

**Curves**

Methods of Locating Curves on Subdivisions (80171). R. Russell Grant. 2500 w. Can Engr—July 26, 1917. Read before Ont. Land Surv's Assn. Methods tried.

**Diagrams**

Influence Lines as Deflection Diagrams (74829). D. B. Steinman. Ills. 2500 w. Eng Rec—Nov. 25, 1916. New method developed. Applications.

**Earth Pressures**

Earth Pressures: A Practical Comparison of Theories and Experiments (74792 D). 18 pp. A S C E, Pro—Nov., 1916. Discussion of L. D. Cornish's paper.

The Strange Case of Clay (76230). 1300 w. Times Eng Supp—Dec. 29, 1916. Review of experimental research, and applications.

Distribution of Pressure in Earth Due to Concentrated External Load (78835). From a bulletin prepared by R. B. Fehr. 2500 w. Eng & Con—May 23, 1917. Tests and results for sand, and for soils having considerable cohesion.

The Distribution of Pressures Through Earth Fills (79503 N). A. T. Goldbeck. Ills. 14 pp. Am Soc Test Mat—June, 1917. Investigations to determine the distribution of vertical pressures under concentrated loads.

**Earth Resistance**

Sur La Stabilité Des Talus De Grande Hauteur (77555 B). M. Jacquinot. Ills. 4000 w. Gen Civ—Feb. 3, 1917. Design of slope of high embankments for stability.

**Evaporation**

A Study of the Depth of Annual Evaporation from Lake Conchos, Mexico (74789 D). 62 pp. A S C E, Pro—Nov., 1916. Discussion of the paper by Edwin Duryea, Jr., and H. L. Haehl.

A New Evaporation Formula Developed (78349). Robert E. Horton. 3100 w. Eng News-Rec—April 26, 1917. Improvement over existing formulæ.

**Flanges**

Tests Apparently Substantiate the Theoretical Formula for Strength of Outstanding Flanges (74536). Raymond J. Roark. Ills. 2500 w. Eng Rec—Nov. 11, 1916. Results of experimental investigation.

**Flat Slab**

Second Test of Seattle Flat-Slab Warehouse Shows Some Decrease in Stresses (78343). Ills. 2500 w. Eng News-Rec—April 19, 1917. Official test of mushroom flat-slab floor.

**Floor Tests**

Deflection and Wall-Girder Tests on Floor of a Flat-Slab Concrete Building 76453). C. E. Locke. Ills. 2100 w. Eng News—Feb. 1, 1917. Tests on the large Pierce-Arrow building at Buffalo, N. Y.

**Flow**

Effect of Channel on Stream Flow (74673 B). Nathan C. Grover. 10 pp. Bos Soc C E—Nov., 1916. Requirements of systematic stream-gaging.

Accuracy of Stream-Flow Data (75247 N). N. C. Grover and J. C. Hoyt. 7 pp. U S Geol Surv, Water Sup paper 400-D—Dec. 2, 1916. Degree of accuracy required; conditions affecting accuracy.

Accuracy of Stream Flow Records (76667). K. H. Smith. 1000 w. Can Engr—Feb. 8, 1917. Comparison of calculations.

Obstruction of Bridge Piers to the Flow of Water (78836 D). Floyd A. Nagler, Jr. Ills. 30 pp. A S C E, Pro—May, 1917. Results of 256 experiments performed in a flume at the Argo Dam, Ann Arbor, Mich., on 34 models of bridge piers. Presents formula to be applied.

Flow Through Sharp Edged V-Notches or Weirs (79351 A). E. W. Doebler and F. H. Rayfield. Ills. 9 pp. Corn C E—May, 1917. Experimental study.

Obstruction of Bridge Piers to the Flow of Water (81470 D). 6500 w. A S C E, Pro—Sept., 1917. Discussion of paper by Floyd A. Nagler, Jr.

**Geodesy**

A Few Thoughts on Geodesy (80172). J. L. Rannie. 4500 w. Can Engr—July 26, 1917. Serial, 1st part. Read before Ont Land Surv's Assn. Topics covered by modern geodesy.

**Ground Water**

Eenige theoretische beschouwingen over kwel (75606 B). F. K. Th. Van Iterson. Ills. 1100 w. Pressure of ground water.

**Hell Gate Bridge**

Stress Measurements on the Hell Gate Arch Bridge (81999 D). D. B. Steinman. 67 pp. A S C E, Pro—Oct., 1917. Details of instruments and methods used and precautions for accurate work, with results.

**Heat Insulation**

A Comparison of the Heat-Insulating Properties of Materials Used in Fire-Resistive Construction (79515 N). W. A. Hull. Ills. 18 pp. Am Soc Test Mat—June, 1917. Importance of porosity.

**Hydrographic Surveys**

Hydrographic Surveys: Recent Improvements in Apparatus and Methods (76459). From a paper by N. H. Heck, before Am. Assn. for Adv. Sci. Ills. 2500 w. Eng & Con—Jan. 31, 1917. Development of the wire drag method and other improvements.

**Hydrography**

Levantamientos Hidrográficos (74880 D). A. Mercau. Ills. 4000 w. Univ Nac Plata—Aug., 1916. Apparatus for observing and determining water levels, courses, etc.

**Integrating Sphere**

The Integrating Sphere and a New Type of Compensating Screen (76090 C). Frank A. Benford, Jr., with discussion. Ills. 16 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Short discussion of the theory with a review of factors that interfere with the application of mathematics.

**Integrator**

The Discharge Integrator (81230 B). C. H. Pierce. Ills. 600 w. Bos Soc C E, Jl—Sept., 1917. Describes operation of instrument for measuring steam flow.

**K-Trusses**

Simple and Cantilever K-Trusses Analyzed (76659). C. L. Warwick. 4000 w. Eng Rec—Feb. 10, 1917. Serial, 1st part. Formulæ derived and influence lines drawn for chord and web stresses and applied to the determination of maximum stresses.

**Laboratory**

Irrigation Field Laboratory at Denver, Colorado (75167). R. B. Sleight. Ills. 1500 w. Eng News—Dec. 7, 1916. Experiments.

Underwriters' Laboratories New Testing Station (79744). Edgar P. Slack. Ills. 1800 w. Elec Wld—July 7, 1917. Features of new laboratory at City Hall Place, New York City.

**Leveling**

Modern Methods of Precise Leveling by the U. S. Coast and Geodetic Survey 76456). 2000 w. Eng & Con—Jan. 31, 1917. William Bowie, in paper before Am. Assn. for Adv. of Sci., describes methods employed.

The Advantages of an Endless Tape Leveling Rod for Profile and Cross-Section Work (76457). Halbert P. Gillette. Ills. 1500 w. Eng & Con—Jan. 31, 1917. Reprint of an earlier article.

Spirit Leveling in Ohio, 1898 to 1916, Inclusive (81121 A). R. B. Marshall. Map. 428 pp. Gov Print Off—Bul 651.

Spirit Leveling in Nevada, 1897 to 1916 Inclusive (82057 N). R. B. Marshall. 80 pp. U S Geol Surv—Bul. 654. Precise and primary leveling.

**Loading**

Charts for Eccentric Loading on Rectangular Areas (77395). S. M. Cotten. 800 w. Can Engr—March 15, 1917. Will cover any reasonable requirements of practice.

**Loads**

Critical Loads for Long Tapering Struts (81716 A). Arthur Morley. 2500 w. Engng—Sept. 21, 1917. Shows how a method described may be applied to the most general cases, and calls attention to errors in a method of Messrs. Bairstow and Stedman.

**Lumber Tests**

How to Test Lumber For Dryness (80207). Thomas D. Perry. Ills. 1800 w. A A Wkly—July 30, 1917. Methods described.

**Mapping**

Geological Sections in the Vicinity of Golden (74603 N). L. Ehnbom. Ills. 1000 w. Col Sl Min Qt—July, 1916. Methods followed.

**Meter Rates**

Committee on Meter Rates. Report on Waste; to which is Added Suggestions for Service Charges for Large Meters (76060 D). 25 pp. N E W-Wks Assn—Dec., 1916. Report and discussion.

**Meter Records**

Meter Records for Small Water Works (76058 D). A. W. F. Brown. Also, A Suggestion That the Association Appoint a Committee to Prepare Standard Specifications for Water Meters. Robert J. Thomas. Two papers discussed together. 11 pp. N E W-Wks Assn—Dec., 1916.

**Nail Joints**

Strength of Nail Joints in Douglas Fir and Western Hemlock (81968). Ills. 1300 w. Eng & Con—Oct. 24, 1917. Tests made by the Bureau of Buildings, of Portland, Ore.

**Piles**

Combined Pressure on Piles from Vertical Loads and Lateral Forces (80672). N. M. Stineman. 2000 w. Eng & Con—Aug. 22, 1917. Derives formulæ for computing the pile loads.

**Pipe Flow**

The Effect of Sudden Enlargement Upon the Flow of Water in Pipes (76022 A). T. J. Rodhouse. Ills. 4000 w. Corn C E—Nov., 1916. Experimental.

**Pipe Tests**

Deflection Tests of Universal Pipe (75917). Ills. 1600 w. Eng & Con—Jan. 10, 1917. Results of tests at Underwriters Laboratories.

**Quantities**

Quantities and Estimates (81171 A). C. O. Mourant. 3000 w. Surv'r—Aug. 24, 1917. Summary of a lecture before Jun. Instn. of Engrs. Methods of measurement used in building and construction work in London.

**Rainfall**

A Safe Method Proposed for Estimating Minimum Rainfall (77688). James P. Wells. Map. 2800 w. Eng News—March 29, 1917. Concludes that minimum-mean factors afford a safe basis.

**Re-location**

Sul Calcolo Della Capacita Dei Rifornitori Ferroviari (80003 C). L. Scuderi. Ills. 3500 w. Ingeg Ferro—June 15, 1917. Theoretical treatment of railway location and grades as influencing traffic capacity.

**River Survey**

An Exploration of the Tazin and Taltson Rivers, North West Territories (81122 N). Charles Camsell. Map & Ills. 83 pp. Can Dept Mines—Mem. 84. Report on physical features, geology, character of district, etc.

**Riveted Joints**

Partition of Load in Riveted Joints (75675). 1500 w. Eng & Con—Dec. 27, 1916. Summary and conclusions from theoretical analyses and experiments made by Cyrol Batho.

**Road Material**

The Results of Physical Tests of Road Building Rock in 1916, Including All Compression Tests (79331). Prévost Hubbard and Frank H. Jackson, Jr. 23 pp. U S Dept Ag, Bul 537—April 21, 1917. Tests and results.

**Rock Tests**

Effect of Controllable Variables on the Toughness Test for Rock (79505 N). F. H. Jackson, Jr. 13 pp. Am Soc Test Met—June, 1917. Investigation with view of using the data in connection with proposed revision of the standard test.

**Silt**

The Measurement of Silt-Laden Streams (74444 N). Raymond C. Pierce. Ills. 12 pp. U S Geol Surv, Water-Supply paper 400-C—Nov. 4, 1916. Difficulties with silt in the San Juan River, Colo., and how overcome.

**Slab Deflection**

Slab Deflection and Subsidence of Column Supports in a Flow Test of International Hall, Chicago, Made September, 1913 (75342 B). Henry T. Eddy. 2500 w. Fkn Inst, Jl—Dec., 1916. Report of tests.

**Steel**

Transverse Tests and Steel Structures (80358 A). George W. Dress. Ills. 1000 w. Iron Age—Aug. 2, 1917. Equalizing of crystallization necessary for best results. How accomplished.

**Steel Columns**

Progress Report of the Special Committee on Steel Columns and Struts (76064 D). 12 pp. A S C E, Pro—Dec., 1916. Records of tests.

**Steel Pipe**

To Compute Stress in Spiral-Riveted Steel Pipe (76342). Arthur Jobson. 600 w. Eng Rec—Jan. 27, 1917. Theoretical analysis.

**Steel Tapes**

A Graphic Method for Correcting Steel Tapes (74298). Walter Scott Weeks. 2000 w. Min & Sci Pr—Oct. 28, 1916. Chart and its use, with formulae.

Measuring the Steel Tape in Mine-Surveying (74423). Walter Scott Weeks. Ills. 800 w. Min & Sci Pr—Nov. 4, 1916. Information of value to surveyors.

Corrections for Sag in Long Steel Tapes (80485). W. H. Rayner. 500 w. Eng & Min Jl—Aug. 11, 1917. Monograph and chart showing correction.

**Strains**

Alternating Stress Experiments (77248 A). William Mason. Read before Instn. of Mech. Engrs. Ills. 3000 w. Engng—Feb. 23, 1917. Serial, 1st part. Measurement of cyclic strains during complete alternating stress tests.

**Stream Flow**

Discussion of "Effect of Channel on Stream Flow" (77473 B). 2500 w. Bos Soc C E, Jl—March, 1917.

**Streams**

The Use of Boats for Making Stream Measurements (77331). P. H. Daniels. Ills. 1200 w. Eng & Con—March 14, 1917. Method employed in making hydrometric surveys in Canada.

**Surveying**

Notes on the Survey of a Large Tract of Land (74602 N). William R. Chedsey. 1500 w. Col Sl Min Qt—July, 1916. Methods used on a tract in New Mexico.

Dominion and Land Survey Monuments (75015). H. L. Seymour. Ills. 1200 w. Can Engr—Nov. 30, 1916. Changes in character since 1871.

Irregular Subdivision Surveys and Computations (75041). R. Conover. 2000 w.

Eng & Con—Nov. 29, 1916. Suggestions for subdivision work.

Tunnel Survey Methods Used in Driving Strawberry Tunnel (75169). L. M. Hammond. Ills. 2000 w. Eng News—Dec. 7, 1916. Modern tunnel surveying on irrigation tunnel.

Making a Town Survey (75700). Edgar S. Closson. Ills. 2500 w. Mun Jl—Jan. 4, 1917. Advantages of having a precise survey.

Methods and Costs of Location Surveys for the Little River Drainage District, Missouri (76077). B. F. Burns. 1500 w. Eng & Con—Jan. 17, 1917. Details.

Helpful Suggestions for Surveying Country Highways (76454). Samuel P. Baird. Ills. 2000 w. Eng News—Feb. 1, 1917. Pointers from practice of experienced surveyor.

Country Surveyor's Records (76462). H. A. Mark. From a paper before the Nebraska Eng. Soc. 1800 w. Eng & Con—Jan. 31, 1917. System of indexing.

Classification Surveys for Assessment Purposes in California (77538). Earl A. Marshall. Ills. 1600 w. Eng News—March 22, 1917. Special reference to uses of land.

Making Surveys For Land and Lake Tunnel at Chicago (80182). 2500 w. Eng News-Rec—July 26, 1917. Triangulation to locate borings; telephone used in survey of long drifts.

Survey of Inclines Without Auxiliaries (80126). A. J. Sale. Ills. 3500 w. Min & Sci Pr—July 21, 1917. Explains method used.

The American Surveyor in the Philippines (80179). J. W. Evans. Ills. 1600 w. Eng News-Rec—July 26, 1917. Conditions and hardships met.

Use of Mean Sea Level as the Datum for Elevations (81644 A). E. Lester Jones. Extracted from U. S. Coast & Geodetic Survey, No. 41. 2500 w. E Cb Phila, Jl—Oct., 1917. Urging its use and explaining why it is desirable.

Instructions of Kentucky Department of Public Roads for Making Road Surveys and Estimates (81574). 2500 w. Eng & Con—Oct. 3, 1917. Extracts from bulletin of instructions for engineers.

**Surveyors**

Some Duties of a Surveyor (78196 A). A. Rothera. 3500 w. Surv'r—April 6, 1917. Street works, sanitary matters, road openings, public health, etc.

**Testing**

Rationality in Physical and Metallographic Testing (77306 F). K. F. Smith. Ills. 25 pp. Am Soc Nav Engrs, Jl—Feb., 1917. Value of the science of metallography is shown.

Report of Committee E-1 on Methods of Testing (79481 N). 4 pp. Am Soc Test Mat—June, 1917. Changes recommended.

**Testing Rig**

Rapid Semi-Autographic Tests for Determining the Proportional Limit (79483 N). H. F. Moore. Ills. 6 pp. Am Soc Test Mat—June, 1917. Apparatus for obtaining in tension tests stress-strain diagrams within the proportional limit.

**Timber**

Diagram for Obtaining Number Feet B. M. in Various Timbers (74810). W. R. Roof. 150 w. Eng & Con—Nov. 22, 1916. Chart and example illustrating use.

**Trigonometrical Tables**

A Brief Review of Trigonometrical Mathematical Tables, and a Contemplation of the Specifications for Trigonometrical Tables for General Use (81992 D). Virgil A. Eberly. 1400 w. A S C E, Pro—Oct., 1917.

**Venturi Meter**

Le Jaugeur Venturi (80720 C + D). C. Camichel, D. Eydoux, and J. Lhériand. Ills. 5900 w. Pont Chaus Ann—Mar.-April, 1917. Theory and detailed description of the Venturi Meter and method of use.

**Viscosity**

See same heading under MECHANICAL ENGINEERING, *Measurement*.

**Water Conduits**

La Stabilisation Des Conduites D'Eau De Grand diamétre (74905 C + D). J. Dejust. Ills. 6000 w. Soc Ing Civ Fr—April-June, 1916. Mathematical treatment of the rigidity of large water pipes.

**Water Pressure**

La Torre piezometrica negli impianti idroelettrici (75550 C). C. Fossa-Mancini. 1000 w. Soc Ing Arch Ital—Nov. 16, 1916. Mathematical discussion of water columns in hydroelectric plants.

**Water Resources**

See same heading under *Water Supply*.

## MUNICIPAL

**Activated Sludge**

Activated-Sludge Novelties at Hermosa Beach, Calif. (74515). A. M. Brosius. Ills. 1400 w. Eng News—Nov. 9, 1916. Details of proposed plant.

Results and Conclusions from a Year's Operation of the Activated Sludge Sewage Treatment Plant of Milwaukee (74521). T. Chalkley Hatton. 3000 w. Eng & Con—Nov. 8, 1916. Major portion of paper before Am. Soc. of Munic. Imp.

Some Remarks on Activated Sludge (74933 A). William T. Carpenter and Murray P. Horowitz. Ills. 3500 w. Am Jl Pub Hh—Nov., 1916. Engineering and laboratory data, and some general principles.

The Activated Sludge Process (74564 A). 1200 w. Surv'r—Oct. 27, 1916. Reports from Manchester and Sheffield, Eng.

Activated-Sludge Results at Cleveland Reviewed (75164). R. Winthrop Pratt and George B. Gascoigne. Ills. 4900 w. Eng News—Dec. 7, 1916. Serial, 1st part. Review of nearly a year's operation. Clarification in this number.

Activated Sludge Process of Sewage Disposal Firmly Established (75775). T. Chalkley Hatton. 3000 w. Eng Rec—Jan. 6, 1917. Most problems solved.

Activated-Sludge Plants at Houston, Texas (76573). C. L. Williford. Ills. 2400 w. Eng News—Feb. 8, 1917. Details of two plants having combined capacity of 19,000,000 gal. per day.

Notes on Experiments with Activated Sludge Process at Regina (76665). J. Russell Ellis. Ills. 1200 w. Can Engr—Feb. 8, 1917. Shows process adaptable to local conditions.

San Marco's Activated Sludge Plant 77184). G. B. Zimmele. Ills. 1800 w. Mun Jl—March 8, 1917. Details of construction and operation of a Texas plant.

Activated Sludge Plant at Edmonton (77707). Ills. 1000 w. Can Engr—March 29, 1917. Details of aerating chamber, motor equipment, and air plant.

Some Remarks on the Biochemical Treatment of Sewage, With Especial Reference to the Activated Sludge Method (77812B). George T. Hammond. 5000 w. Jl Ind & Eng Chem—April, 1917. Progress in knowledge of this subject.

The Activated Sludge Process of Sewage Purification (78039A). Edward Ardern, with discussion. 3000 w. Surv'r—March 23, 1917. From *Jl. Soc. of Chem. Ind.* Results of investigations.

The Purification of Sewage in the Presence of Activated Sludge, Illinois (78109B). Edward Bartow, F. W. Mohlman and J. F. Schuellbach, with discussion. 14 pp. West Soc Engrs Jl—Feb., 1917. Experimental work.

Activated Sludge Experimental Work at Milwaukee (79234). Ills. 3000 w. Can Engr—June 14, 1917. Extracts from annual report of Milwaukee Sewage Commission.

Marked Advance in Treating Sewage from Packing Houses (79015). G. B. Zimmele. Ills. 1500 w. Eng News-Rec—May 31, 1917. Experimental activated sludge plant at Fort Worth, Tex. Results obtained.

Recommend 50,000,000-Gal. Activated Sludge Plant (79366). 2500 w. Eng News-Rec—June 21, 1917. Joint committee representing Chicago Sanitary District and packers advise six months' trial operation of a 1,500,000-gal. single unit.

Activated Sludge Plant at Worcester, England (79926). Ills. 2500 w. Can Engr—July 12, 1917. Results of experimental work.

Sewage Aeration and Activated Sludge (80090 A). 3300 w. Engng—July 6, 1917. Outlines the general features of the problem and describes installations.

The Activated Sludge Process at Worcester (79937 A). Ills. 5000 w. Surv'r—June 15, 1917. Details of works and results.

Activated Sludge Process of Sewage Purification at Worcester (80396 A). Thomas Caink. Read before Assn of Mgrs of Sewage Disposal works. Ills. 5500 w. Engng—July 13, 1917. Detailed description of the plant and process and results achieved.

The Activated Sludge Process (80740). 1900 w. Times Eng Supp—July 27, 1917. Description of plant at Worcester, England.

Comparative Tests of Air Diffusers and Devices for Dewatering Activated Sludge (81073). Ills. 2200 w. Eng & Con—Sept. 12, 1917. Abstract of paper by Edward Bartow, before Am. Inst. of Chem. Engrs. Results of tests.

The Activated Sludge Process of Sewage Purification (81062 A). Edward Ardern. Extracts from a paper read before the Soc. of Chem. Ind. 2500 w. Surv'r—Aug. 17, 1917. A résumé of the present position.

Activated Sludge Promises to Solve Packing-House Wastes Problem (81979). Langdon Pearse. 1500 w. Eng News-Rec—Oct. 25, 1917. Notes based on experiences at Chicago plants.

**Amsterdam**

Mitbreiding van Amsterdam (76221 B). A. W. Bos. Ills. 3900 w. Ingr—Dec. 9, 1916. Changes and increased area of the city of Amsterdam from 16th century.

**Building Zones**

The Preparation of the Building District Maps of the City of New York (74782 B). Edward M. Law. Ills. & Maps. 2500 w. Mun Engrs Jl—Nov., 1916. Districts of building control governing future city development.

Legality of Zone Ordinances (75321). Walter F. Meier. From paper before the League of Washington Munic. 2500 w.

Mun Jl—Dec. 14, 1916. Decisions by the courts of several states.

**Catch Basins**

Catch Basin Construction and Maintenance (77370). Ills. 3000 w. Mun Jl—March 15, 1917. Review of discussion by the sanitary section of the Boston Soc. of Civ. Engrs.

**City Betterment**

La Ciudad Alegre Y Descuidada (80000 A). M. D. Quinones. Ills. 5400 w. Soc Cub Ing Rv—June, 1917. Street conditions in Havana in need of improvement. Obstructions, unsightly billboards, bad pavements, etc.

**City Managers**

The City Manager Movement (77286 B). Sam Siverts, Jr. 2500 w. Af Eng Soc Minn, Bul—1916. Benefits derived from city manager government.

**City Planning**

Ideen-Wettbewerb für einen erbauungsplan der Gemeinde Bözingen (74914 B). Ills. 1200 w. Schweiz Bau—Nov. 4, 1916. Designs and plans for improvements at Bözingen.

Il nuovo palazzo della Provincia ed il piano regolatore di Bologna (74851 C). Ills. 2100 w. Soc Ing Arch Ital—Oct. 16, 1916. New scheme of improvement for the city of Bologna, Italy.

Projet De Boulevard Et De Chemin De Fer Electrique (74865 B). Ills. 900 w. Gen Civ—Oct. 21, 1916. Boulevard and electric railway project from Paris to Saint-Germain.

La Cité Reconstituée (75597 C + D). G. Espitalier. Ills. 5600 w. Soc Enc Ind Nat—Sept.-Oct., 1916. Exhibition of quickly built houses to be utilized after the war, for rebuilding destroyed towns.

Town Planning in Wales (75124 A). T. Alwyn Lloyd. 2500 w. Surv'r—Nov. 17, 1916. With special reference to the development of hilly sites.

City Planning (76586 A). Joseph W. Shirley. 4000 w. E Cb Balt, Jl—Feb., 1917. General discussion of subject, with special reference to Baltimore.

Goodyear Builds City for Its Workers (77034). Allen Sinsheimer. Ills. 1500 w. Auto—March 1, 1917. Tire company's solution of a manufacturer's problem.

The Engineer and City Planning (77320 A). Harland Bartholomew. Ills. 14 pp. E Cb St L, Jl—Jan.-Feb., 1917. Underlying principles.

The Laying Out of Streets and Boulevards in Relation to Modern Town Planning (77638). L. McLaren Hunter. Ills. 1000 w. Can Engr—March 22, 1917. Suggestions.

**City Streets**

Important Features Relating to the Design and Improvement of City Streets (79339 B. N. S. Sprague, with discussion. 65 pp. Engrs Soc W Penn—May, 1917. Reviews features relating to this work and the problems engineers must solve.

**Disinfection**

Facts and Fallacies in Disinfection (77687 A). Herbert C. Hamilton. 5500 w. Am Jl Pub Hh—March, 1917. Comparative values of substances used.

**Districting**

The Relation of Districting to Public Improvements and Real Estate Values (78063). Sidney J. Williams. 2200 w. Wis Engr—March, 1917. Generally favorable to such laws.

Method of Providing Drainage Facilities for 1st Illinois Cavalry Camp at Brownsville, Texas (77993). Charles E. De Leuw. Ills. 1800 w. Eng & Con—April 11, 1917. Details of the work.

**Drainage**

A Method of Financing Sanitary Improvements for the Poorer Property Owners (77992). 2000 w. Eng & Con—April 11, 1917. Abstract of paper before the Indiana San. Water Supply Assn.

**Dust-Bins**

The Dust-Bins of Greater London (79020 N). Reginald Brown. 8500 w. Instn Mun & Cnty Engrs, Jl—April, 1917. Problems and suggestions for their solution.

**Excavation**

Trench and Tunnel Excavation (79714 A). J. F. Springer. Ills. 2500 w. Mun Eng—July, 1917. Serial, 1st part. Details of work in sewer construction.

**Fire Alarms**

Up-to-Date Fire-Alarm System of Somerville (75494). George A. Broder. Ills. 1000 w. Elec Rv & West Elec—Dec. 23, 1916. Arrangements, wiring, and operation for small city.

**Fire Protection**

Fire Service (75812 B). Ills. 1200 w. Prac Engr, Chi—Jan. 1, 1917. Pump, hydrant, standpipe, and hose connections, etc.

Nonfireproof Institutional Buildings in New York City Made Safe Against Fire (76075). Ills. 3000 w. Eng News—Jan. 18, 1917. Methods employed. Mainly horizontal fire escapes.

The Operation of High Pressure Fire Service Systems (75915). 2000 w. Eng & Con—Jan. 10, 1917. From report of Committee of Nat. Board of Fire Underwriters. Data on operation in Philadelphia, Baltimore, and New York.

Les Incendies a Paris (78277B). Ills. 1500 w. La Nat—March 24, 1917. Abstract of recently published report of fires in 1915.

**Garbage**

Garbage Collection and Disposal by a Small City (74522). Extracts from paper by Edward E. Duff, Jr., before Am. Soc. of Munic. Imp. 1200 w. Eng & Con—Nov. 8, 1916. Method at Swickley, Pa.

Garbage Reduction Plant for New York City (74518). 2000 w. Mun Jl—Nov. 9, 1916. Details of construction. To be largest reduction plant in the world.

Prof. Whipple Reports on New York's Proposed Garbage-Reduction Works (75930). 2500 w. Eng Rec—Jan. 13, 1917. Experts predict that plant with 2000 tons daily capacity will be a nuisance at times.

Chicago's Half-Completed Garbage-Reduction Plant Turns Expense Into Income (76657). H. A. Allen, before Chicago chapter of A. S. M. E. Ills. 1200 w. Eng Rec—Feb. 10, 1917. New control unit, a five-yard box, and inoffensive operation.

Alcohol from Garbage (78849). 2000 w. Mun Jl—May 24, 1917. Experiments at Columbus, Ohio, indicate a profit in utilizing garbage this way.

Saving Expense in Garbage Collection (79076 A). John N. Edy. Ills. 4500 w. Mun Eng—June, 1917. A study of conditions in Billings, Montana.

Garbage Disposal by Incineration, Reduction, and Feeding to Swine (81072). 2500 w. Eng & Con—Sept. 12, 1917. Important facts concerning garbage disposal methods and costs in various cities.

**Garbage Disposal**

Worcester Owns and Operates a Model Garbage-Disposal Piggery (80825). Frederic Bonnet, Jr. Ills. 3300 w. Eng News-Rec—Aug. 30, 1917. Fed to hogs under modern sanitary conditions.

**Horses**

The Selection, Training and Care of the Horse for Street Cleaning Work (74364). Daniel J. Mangan. 3500 w. Eng & Con—Nov. 1, 1916. From paper before Soc. for Street Cleaning and Refuse Disposal. Selection, care, training, etc.

**Imhoff Tanks**

Imhoff Tanks and Sprinkling Filters, Cleburne, Tex. (75034). R. E. McDonnell. Ills. 1300 w. Eng News—Nov. 30, 1916. Design.

Septic Tanks Reconstructed as Imhoff Tanks at Columbus (79017). C. P. Hoover. Ills. 1500 w. Eng News-Rec—May 31, 1917. Serial, 1st part. New tanks built while half of old plant was kept in service.

**London**

Main Drainage of London (77583). 1300 w. Times Eng Supp—Feb. 23, 1917. Report of London County Council on work now going on for improving the system.

**Military Sanitation**

Military Sanitation in the Present War (79383 A). Thorndike Saville. Ills. 20 pp. Am Jl Pub Hh—June, 1917. Abstracts from two recent books on military hygiene and sanitation.

**Minneapolis**

The New Industrial District of Minneapolis (79821 N). L. H. Brittin. Ills. 10 pp. Af Eng Soc of Minn, Bul—July, 1917. Aims to develop an ideal industrial district to stimulate city growth.

**Municipal Engineering**

A Survey of Municipal Engineering (76369 A). Edward Whitwell. 6500 w. Surv'r—Jan. 12, 1917. Serial, 1st part. Inaugural address to the Instn. of Munic. Engrs.

Some Notes on the Uses of Electricity in Municipal Engineering (76870 A). Horace Boot. 2500 w. Surv'r—Jan. 12, 1917. Uses to which electricity may be applied.

**Municipal Enterprise**

Individual Interest in Municipal Enterprise (79934 A). J. Horace Bowden. (Abstract). 3000 w. Elec'n—June 22, 1917. How to successfully control a municipal undertaking.

**Municipal Housings**

Some Observations on Municipal Housing (78041A). John H. Mole. 4000 w. Surv'r—March 23, 1917. Extracts from paper read before Inst. of Municipal Engineers.

**New York**

The New Zoning Ordinance of New York City (76438 B). Louis Graves. 6000 w. Archt-Forum—Jan., 1917. Building restrictions.

**Park Grading**

Park Grading by Day Labor (74812). Ills. 1100 w. Eng News—Nov. 23, 1916. Artificial topography made in Chicago park.

**Property Control**

How New York City Now Controls the Development of Private Property (76168 A). George B. Ford. 2500 w. E Cb Balt—Jan., 1917.

**Public Baths**

Description of Barton Hill Baths, Bristol (76364 N). H. W. Harding. 1500 w. Instn Mun & Cnty Engrs, Jl—Jan., 1917. Special features.

**Public Utilities**

Shall Municipalities Own Their Utilities? (80158 A). A. G. Christie. 4500

w. Ind Man—Aug., 1917. Discussion based upon extensive experience.

**Public Works**

Street Cleaning and Refuse Collection Methods (78596). 2500 w. Mun Jl—May 10, 1917. Serial, 1st part. From report of methods in Detroit, Mich., with recommendations for improvements.

**Rangoon**

Municipal Work in Rangoon from 1907 to 1916 (79021 N). Launcelot Paul Marshall. Ills. 27 pp. Instn Mun & Cnty Engrs, Jl—May, 1917. Account of work carried out since 1907.

**Refuse**

Motor Refuse Collectors in New York (74805). C. L. Edholm. Ills. 1200 w. Mun Jl—Nov. 23, 1916. Economy and effectiveness of the vehicles.

Refuse Destruction (74305 A). John B. C. Kershaw. 3500 w. Engr—Oct. 13, 1916. Calorific value; improvements in destructor process; value from the standpoint of the power engineer.

Utilization of Waste Materials from Town Refuse (74774 A). W. H. Maxwell. Ills 2000 w. Cas Eng Mthly—Nov., 1916. Profitable materials recovered.

Don Incinerator—Torron (77392). Ills. 2500 w. Can Engr—March 15, 1917. Details of construction and methods.

The Dust-Bins of Greater London (78825 A). Reginald Brown, with discussion. 8000 w. Surv'r—May 4, 1917. (Abstract.) Method of storage, collection, disposal, etc.

Refuse Collection and Incinerator Design (79138). C. G. Peterson. 1800 w. Mun Jl—June 7, 1917. Requirements to be embodied in contract for plant. Choosing equipment.

House Refuse: Its Calorific Value and Its Possibilities (79938 A). Reginald Brown. 1500 w. Surv'r—June 15, 1917. Serial, 1st part. Methods of disposal and value as fuel.

**Refuse Destructor**

Refuse Disposal in Small Towns (77680 A). George W. Simons, Jr. 1600 w. Am Jl Pub Hh—March, 1917. Towns under 8000 inhabitants. Disposal problems.

Notes on the Eastville Refuse Destructor, Bristol (76368 N). A. H. Claypoole. Ills. 1500 w. Instn Mun & Cnty Engrs, Jl—Jan., 1917. Details of plant and cost.

**St. Louis**

Report to the St. Louis Commercial Club and the St. Louis Chamber of Commerce by the Board of Engineers (81231 A). Ills. Plans & Maps. 20 pp. E Cb St L, Jl—July-Aug., 1917. Suggestions for future development of St. Louis.

**Sanitation**

The Progress of Sanitation (74656 A). Ezra B. Whitman. 4500 w. E Cb Balt, Jl—Nov., 1916. Problems of pure water supply, sewage disposal and garbage.

The Work of the County Sanitary Engineer (75315). 1200 w. Eng & Con—Dec. 13, 1916. From paper by L. A. Boulay. Outlines work in Lucas Co., Ohio.

Sanitation in Great Industrial Plants (77681 A). 2500 w. Sfty Eng—March, 1917. Recommendations and suggestions by the Sanitation Committee of the U. S. Steel Corporation.

Military Sanitation (79367 B). W. P. Chamberlain. 1500 w. Bos Soc C E—June, 1917. Points where engineer and physician can be of assistance to each others.

Sanitation in British Army Camps (79221). Ills. 1400 w. Mun Jl—June 14, 1917. Serial, 1st part. Methods developed during the present war.

Two Historic World-Pestilences Robbed of Their Terrors by Modern Sanitation (79329 A). D. Greenberg. Maps & Ills. 3000 w. Sci M—June, 1917. Successful methods of overcoming bubonic plague and cholera.

Sanitation in Some Canadian Barracks and Camps (80762 A). J. G. Fitzgerald and J. W. S. McCullough. 3500 w. Am Jl Pub Hh—Aug., 1917. Account of the general and personal sanitation in winter quarters and summer camps.

Qualifications of Sanitary Inspectors (81841 A). Duncan Campbell. 2200 w. Surv'r—Sept. 21, 1917. From a paper before the Inc. San. Assn. of Scotland. Training and qualifications needed.

The Practical Application of Modern Sanitation (81842 A). F. G. Holmes. 2200 w. Surv'r—Sept. 21, 1917. Extracts from presidential address to Inc. San. Assn. of Scotland. How to make communities healthier and happier.

See same heading under *Water Supply.*

**Sanitary Engineering**

Relations Between Sewage Disposal and Water Supply Are Changing (77849). George W. Fuller. 2000 w. Eng News-Rec—April 5, 1917. Progress in sanitary engineering.

**Sewage**

Slaughter-House Sewage Test Plant, Buenos Aires (74369). Waldo S. Coulter. 1300 w. Eng News—Nov. 2, 1916. Operating experience and experimentation.

Diffusion of Sewage in Salt Water (76072). Ills. 1000 w. Mun Jl—Jan. 18, 1917. Experiments in laboratory and in N. Y. harbor with sewage discharged below the surface.

Tests of a New Process of Sewage Purification With Grease Recovery and Apparent Profit (77994). Eng & Con—April 11, 1917. Process invented by George W. Miles.

A Photographic Study of Sewage Distribution on a Sprinkling Filter (79132 A). C. L. Walker. Ills. 1300 w Corn C E—April, 1917. Shows ice formation and area reached by a distributor.

Unusual Location of Tanks Obviates Pumping at Sewage Filters (79870). G. Everett Hall. Ills. 2500 w. Eng News-Rec—July 12, 1917. Clarification at head of outfall gives low self-cleansing velocity and saves grade.

The Determination of Nitrate in Sewage by Means of Otho-Tolidine (80278 B). Earle B. Phelps and H. L. Shoub. 2000 w. Jl Ind & Eng Chem—Aug., 1917. Methods.

Purification of Sewage by Aeration in the Presence of Activated Sludge (80946 B). Edward Bartow. Ills. 4500 w. Jl Ind & Eng Chem—Sept., 1917. Read before Am. Inst. Chem. Engrs. Third article on results from purification of sewage. Experimental work.

**Sewage Disposal**

L'Epuration Des Eaux D'Égout (74906 C + D). H. Verrière. 64 pp. Pont Chaus Ann—March-April, 1916. Various methods of sewage purification and disposal discussed.

Operation of Baltimore Sewage Disposal Plant (74374). Gustav J. Requardt. Ills. 2000 w. Mun Jl—Nov. 2, 1916. Facts and figures concerning the building and operation.

Recommend Isolated Sewage-Treatment Plants for Lake City North of Chicago (74832). 2500 w. Eng Rec—Nov. 25, 1916. Expert advice.

Reports on Year's Operation of Fitchburg Sewage Works (74412). F. W. Jones. 2500 w. Eng Rec—Nov. 4, 1916. Experiences in the maintenance of Imhoff tanks and sprinkling filters.

Experience and Results of Four Years' Operations of Coarse Screens, Grit Chambers, Imhoff Tanks and Trickling Filters at Atlanta, Ga. (75813). Charles C. Hommon. Read before Am. Soc. of Munic. Imp. 2200 w. Eng & Con—Dec. 13, 1916.

Sewage Disposal at Leeds (75123 A). 2500 w. Surv'r—Nov. 17, 1916. Treatment during 1915-16. Analyses and working costs.

Sewage Disposal for Village and Rural Homes (75381 N). C. S. Nichols. Ills. 25 pp. Iowa St Col, Bul 41—Aug. 10, 1916. Fundamental principles, etc.

Sewage-Disposal Methods in Several American Cities (75204). T. D. Allin and R. V. Orbison. Ills. 3000 w. West Eng—Dec., 1916. Reports from 16 cities and the results.

Wayne Sewage Disposal Works After Nine Years' Use (75434). G. Everett Hill. Ills. 3000 w. Eng News—Dec. 21, 1916. Plant and operating results.

A New Type of Trickling Filter (76185 A). G. G. Nasmith. 2000 w. Surv'r—Jan. 5, 1917. Brushwood, pressed into bundles, used with success.

Engineers Guide Sewage-Disposal Inspection Trip (76131). 2500 w. Eng Rec—Jan. 20, 1917. Results of a trip by Decatur (Ill.) officials.

Mt. Kisco Sewage Disposal Plant (76083 N). T. D. L. Coffin, and F. E. Hale, with discussion. Ills. 5000 w. Am Wr Wks Assn, Jl—Dec., 1916. Arrangement and operation.

Rochester's Sewage Treatment Plant (76283). Ills. 2000 w. Mun Jl—Jan. 25, 1917. Imhoff plant with unusual features.

Travis Tank and Sprinkling Sewage Filters, Paqueta Island, Rio de Janeiro (76073). Charles J. Seiber. Ills. 1800 w. Eng News—Jan. 18, 1917. With automatic reverse-travel distributor.

Brushwood as a Medium for Sewage Filters (76668). George Phelps. Ills. 2200 w. Can Engr—Feb. 8, 1917. Experiments at North Toronto using brushwood and slag as filter media.

Illinois Sewage-Plant Operation Needs Better Attention (76865). 1500 w. Eng Rec—Feb. 24, 1917. Winter operation found inadequate.

Sewage Disposal at Houston, Texas (76949). E. E. Sands. 2000 w. Wis Engr—Feb., 1917. Results of experiments with activated sludge.

Institutional Sewage Plants (77679 A). Charles F. Mebus. 1800 w. Am Jl Pub Hh—March, 1917. Treatment problems are considered.

Sewage Disposal for Suburban and Rural Homes (77062 B). Charles Sabin Nicholas. Ills. 4500 w. Archt Forum—Feb., 1917. Fundamental principles and types of plants.

The Sewage Disposal Works of Mason City, Ia. (77332). Robert F. Gayton. Ills. 800 w. Eng & Con—March 14, 1917. Details of plant under construction for a small city.

Worcester's 35-Year Grapple with the Sewage-Disposal Problem (77209). W. L. Butcher. 1600 w. Eng News—March 8, 1917. History of development.

Modern Sewage Treatment (78108B). T. Chalkley Hatton. 14 pp. West Soc

Engrs Jl—Feb., 1917. Modern methods in Europe and America, with a plea for the activated sludge process.

Stream Inspection in Connection With the Operation of Sewage Treatment Works (77811B). C. B. Hoover. 1500 w. Jl Ind & Eng Chem—April, 1917. Observations, tests and analysis necessary.

The Proposed Sewage Disposal Plant at Minot, N. D. (78684 B). Augustus Hunt, with discussion. 4000 w. N Dak Soc Engrs, Pro—1917. Plant consisting of a pump well, two Imhoff tanks, six sludge beds, four contact beds, and aerating outfall.

Kitchener Sewage Disposal Works (79386). Herbert Johnston. Ills. 1500 w. Can Engr—June 21, 1917. Will have two complete disposal systems of different types.

L'Épuration Des Eaux D'Égout (79420 C + D). H. Verriére. Ills. 145 pp. Pont Chans Ann—Jan.-Feb., 1917. Results obtained with settling tanks, filters, etc., at Mesly, France.

Operating Results of Imhoff Tank Sewage Disposal Works of Fitchburg, Mass. (79214). 3000 w. Eng & Con—June 13, 1917. Information from report of F. W. Jones. Satisfactory results.

Sewage Disposal in Shanghai (79051 A). Arthur Stanley. 1100 w. Surv'r—May 18, 1917. Information from the annual report of the health officer.

Dallas Builds Inhoff Sewage Works Fed by Concrete Pressure Line (79749). Richard Gould. Ills. 2000 w. Eng News-Rec—July 5, 1917. Concrete pressure line nearly 3 miles long carries sewage from pumping station to disposal plant.

Modern Sewage Purification Works Design, Construction, and Management (80112 A). Charles Terry. 3000 w. Surv'r—June 29, 1917. Best existing practice.

Changes in Cleveland Sewage-Disposal Plans Recommended (80588). 5000 w. Eng News-Rec—Aug. 16, 1917. Details of proposed changes.

Report of Committee on Sewage Works Operation and Analytical Methods to the Sanitary Engineering Section of the American Public Health Association (80764 A). 9 pp. Am Jl Pub Hh—Aug., 1917. Presented at recent Cincinnati meeting.

**Sewage Treatment**

A Comparison of the Activated Sludge and the Imhoff Tank-Trickling Filter Processes of Sewage Treatment (76561). Harrison P. Eddy, with discussion. Ills. 87 pp. West Soc Engrs, Jl—Dec., 1916. Discussion of construction and operation costs based on studies of two treatment plants.

Traitement Des Eaux D'Égout (81401 B). 5000 w. Ind Elec—Aug. 25, 1917. Serial, 1st part. Electrolytic method of sewage treatment. Electrical details and efficiency of plant near New York.

**Sewage Works**

To Meet State Laws Austin Proposes Thoroughgoing Sewage Works (81907). John H. Gregory. Ills. 3000 w. Eng News-Rec—Oct. 18, 1917. Plans for Austin, Tex., include automatically controlled pumps, Imhoff tanks, sludge-drying beds, four dosing tanks, trickling filters, etc.

Report of Committee on Sewerage and Sewage Disposal (81678 A). 7 pp. Am Jl Pub Hh—Oct., 1917. Report of the sanitary engineering section of the American Public Health Assn.

**Sewerage**

Definition of Terms Used in Sewage and Sewage Disposal Practice (77227). 3000 w. Can Engr—March 8, 1917.

Design of Milwaukee's New Sewerage System Based on Conditions 35 Years Hence (78081). Carl H. Nordell. Ills. 4500 w. Eng News-Rec—April 12, 1917. Methods for determining future population, area, domestic and storm water run-off.

Special Features of Sewerage Development at Wellsboro, Pa. (78594). Henry W. Taylor. Ills. 2500 w. Eng & Con—May 9, 1917. Features of disposal plant designed to meet conditions.

**Sewer Pipe**

Apparatus for Testing Concrete Pipe (75912). E. G. Orbert. Ills. 800 w. Mun Jl—Jan. 11, 1917. Home-made apparatus used at West Allis, Wis.

Testing Reinforced Concrete Pipe at Boulder (75911). George R. Joslyn. Ills. 1700 w. Mun Jl—Jan. 11, 1917. Machinery, methods, and costs.

**Sewers**

Chicago's Norwood Park Sewer (74551 A). Ills. 1500 w. Mun Eng—Nov., 1916. Methods of construction.

Prevention and Removal of Deposits from, and Repairs of, Sewers (74302 A). Henry A. Cutler. 1800 w. Surv'r—Oct. 13, 1916. Difficulties and means of overcoming them.

Unlined Sewer Tunnel in Rock at Rochester (74512). Charles L. Raymond. Ills. 800 w. Eng News—Nov. 9, 1916. Descriptive.

Binghamton's Intercepting Sewer (75495). W. Earl Weller. Ills. 2200 w. Mun Jl—Dec. 28, 1916. Four inverted syphons at river crossings.

First Tile Sewer in St. Louis Compared to Brick (75033). Ben Moreell. Ills. 2000 w. Eng News—Nov. 30, 1916. Comparison of brick and tile construction for sewers.

Segmental Block Sewers (75270 A). J. F. Springer. Ills. 2300 w. Mun Eng —Dec., 1916. Advantages, methods of construction, etc.

Neponsit Sewerage System (75496). Andrew J. Provost. Ills. 1500 w. Mun Jl—Dec. 28, 1916. Cast iron pipe used for mains.

Cave Over Mine Complicates City's Sewerage Problem (76341). 1200 w. Eng Rec—Jan. 27, 1917. Jack-supported flume spans caving ground.

Construction Methods on the Mill Creek Sewer Tunnel in St. Louis (75781 A). Stanley E. Bates. Ills. 1800 w. Contr —Jan. 1, 1917. Serial, 1st part. Details of handling rock and quicksand.

Replacing a New York Sewer (75990). Ills. 2200 w. Contg—Jan., 1917. Construction of rectangular reinforced concrete sewer in open trench and cofferdam.

The Mill Creek Sewer (75948 A). E. J. Rossback. Ills. 3500 w. Mun Eng— Jan., 1917. Contractors' practice.

Brick Sewers (76625 A). J. F. Springer. Ills. 5500 w. Mun Eng—Feb., 1917. Recent methods of using brick in sewer construction.

Methods and Cost of Building a Concrete Sewer, Involving the Use of Steel Forms (76717). 1000 w. Eng & Con— Feb. 14, 1917.

Building a Sewer in Creek Channel at Austin, Tex. (77337). Julian Montgomery. Ills. 1500 w. Eng News—March 15, 1917. Features of the work.

Concrete Sewer Failure (77391 A). M. T. Cantell. Ills. 1500 w. Mun Eng— March, 1917. Due to poor aggregate and defective methods.

Extension of the North Metropolitan Sewerage System Outfall at Deer Island, Boston Harbor (77472 B). Clarence A. Moore. Ills. 2000 w. Bos Soc C E, Jl— March, 1917. Details of work in progress.

Manchester, Mass., Outfall Sewer (77471 B). Raymond C. Allen. Ills. 3500 w. Bos Soc C E, Jl—March, 1917. Outlines the development of this seaside town, its water system and sewerage, giving details of the construction of the outfall sewer.

Reconstruction and Diversion of Sewers on Account of New York Subways (77527 B). Samuel D. Bleich. Maps & Ills. 32 pp. Mun Engrs Jl—March, 1917. General survey of this sewer problem.

New Intercepting Sewer at Chicago Stock Yards Has Brick Arch Anchored to Concrete Base (77858). L. B. Barker. Ills. 2000 w. Eng News-Rec—April 5, 1917. Details of construction.

Reconstruction and Diversion of Sewers on Account of New York Subways (78247B). Joseph L. Hunt. Ills. 3500 w. Mun Engrs Jl—April, 1917. Discussion of Samuel D. Bleich's paper on sewers.

Design of Outlet Sewers and Sewer Outlets (78808 B). Map. 3000 w. Mun Engrs Jl—May, 1917. Principles governing the design of treatment plants. Report recommending certain general rules governing the design.

Some Costs of Sewer Work (78500). W. G. Cameron. Ills. 1200 w. Can Engr —May 3, 1917. Features of sewer built in three sections, with useful cost data.

Terminology in Sewer and Sewerage-Disposal Design (78809 B). 2500 w. Mun Engrs Jl—May, 1917. Definitions of terms used.

Construction of the Woodville Avenue Sewer, Toronto (80896). W. G. Cameron. Ills. 2500 w. Can Engr—Aug. 30, 1917. Circular sewer, 8 ft. in diameter, which presented many difficulties owing to the nature of the ground.

Sewerage System of Daytona (80895). George A. Main. Ills. 2000 w. Min Jl— Aug. 30, 1917. Details of collecting and treatment systems for a Florida town.

Designing Inverted Sewer Siphons (80882 A). Joseph L. Hunt. Ills. 2200 w. Mun Eng—Sept., 1917. First one built in 1900; information concerning their construction and cost.

Intercepting Sewer Construction in the Northern Part of the Sanitary District of Chicago (81249 B). H. R. Abbott. Ills. 32 pp. West Soc Engrs, Jl—June, 1917. Methods of work, construction problems, difficulties and their solution. Cost data.

Methods and Costs of Constructing 4,173 Feet of Large Concrete Sewer (81071). E. T. Thurston. 5000 w. Eng & Con—Sept. 12, 1917. Detailed account of the work.

Sewer Drop Manholes (81374 B). Irwin W. Whittemore. Ills. 2500 w. Mun Engrs Jl—Sept., 1917. Details relative to drop manholes.

The Capacity of Outfall Sewers (81204 N). William Fairley. 12 pp. Instn C E —No. 4192. Curves, and estimates for determining design and required capacity.

Construction Plant and Methods Employed in Building the Woodville Avenue Sewer, Toronto, Ont. (81577 A). Ills. 2500 w. Mun Eng—Oct., 1917. Construction methods described.

Two Toronto Sewers Built on Piles and Timber Bents (81628). W. G. Cameron. Ills. 1500 w. Can Engr—Oct. 4 ,1917. Problems involved and their solution.

**Snow Removal**

Mobilization of Private Vehicles May Solve City Snow-Removal Problem (75388 A). Ills. 1500 w. Com Vhle—Dec. 15, 1916. System of Fifth Ave. Coach Co., in New York City.

Problems and Methods in Snow Removal and Disposal (75211). H. S. Richards. 2200 w. Br Rds & Sts—Dec., 1916. How these are handled in Chicago.

**Stop Signals**

Chicago Has Problem to Protect Street Traffic at Drawbridges (77386). F. H. Avery. Ills. 3500 w. Eng Rec—March 17, 1917. New devices installed to prevent pedestrians and automobiles from plunging into river.

**Street Cleaning**

Motor Vehicles the Key to N. Y. Street-Cleaning Problems 79142). Ills. 2500 w. Eng News-Rec—June 7, 1917. Information from Commissioner Featherston's annual report. Noteworthy progress in 1916.

Street Cleaning—A Problem in Sanitary Engineering (79133 A). James W. Routh. 2800 w. Corn C E—April, 1917. Outlines some of the engineering features of the problem of cleaning city streets.

Street Cleaning in Philadelphia (79220). Ills. 2500 w. Mun Jl—June 14, 1917. From a report of William H. Connell. Anti-littering campaign. How it was conducted.

Cleaning of St. Louis' Streets With Vacuum Cleaner (79825 A). C. M. Talbert. 2500 w. E Cb St. L, Jl—May-June, 1917. Report of experimental trial and results.

Efficiency Methods in Street Cleaning (79715 A). Ills. 2500 w. Mun Eng—July, 1917. How N. Y. City lowered costs while extending service and increasing wages.

Flushing—Its Place in the Street Cleaning Field (79995). Raymond W. Parlin. Ills. 1200 w. Can Engr—July 19, 1917. Particularly mechanical flushing equipment.

How Philadelphia Conducted an Educational "Clean Streets" Campaign (79738). 1700 w. Eng & Con—July 4, 1917. Details of the campaign taken from report of William H. Connell.

Report of the Committee on Street Cleaning, Sanitary Section, American Public Health Association (81679 A). 14 pp. Am Jl Pub Hh—Oct., 1917. Read at Cincinnati meeting.

**Street Intersections**

A Method of Grade Calculations for Street Intersections (75147). R. G. McMullen. 1500 w. Eng & Con—Dec. 6, 1916. Proposed method for city of Portland, Ore.

**Street Plan**

Improved Major-Street Plan For St. Louis Proposed by City Plan Commission (80066). Harold Bartholomew. Ills. 2500 w. Eng News-Rec—July 19, 1917. Widening and minor extensions proposed.

**Streets**

Widening Existing Streets to Meet Traffic Demands (80966). 2200 w. Eng & Con—Sept. 5, 1917. Abstract of paper by Nelson P. Lewis before the Nat. Conf. on City Planning. Problems encountered in providing for increased traffic.

**Tannery Wastes**

Purification of Tannery Wastes (80424). From paper by H. B. Homman. 4000 w. Eng & Con—Aug. 8, 1917. Report of tests and conclusions.

**Town Planning**

Opportunities in Town Planning (74303 A). J. W. Cockrill. 2200 w. Surv'r—Oct. 13, 1916. Work in progress in England.

Town Planning in Southern India (78195 A). H. V. Lanchester. 3000 w. Surv'r—March 30, 1917. Planning schemes, housing, drainage, etc.

A Practical Township Settlement Plan (81024). W. A. Begg. Ills. 1500 w Can Engr—Sept. 6, 1917. Size and shape of lots and road system adapted to the topography of prairie provinces.

Civic Architecture and Town Planning (80958 A). Beresford Pite. 6000 w. Roy Soc Arts, Jl—Aug. 17, 1917. Serial, 1st part. A study of civic planning. The present article considers cities of Egypt, Assyria, Babylon, and Persia.

**Traffic Regulation**

Rotary Traffic Regulation at Street Intersections (77389 A). William P. Eno. Ills. 1800 w. Mun Eng—March, 1917. Promising method for relieving congestion.

**Wales**

Porthcawl and Its Public Works (80694 A). Frederick Hatcher, with discussion. 8000 w. Surv'r—Aug. 8, 1917. New undertakings.

**Waste**

The Fertilizer Value of City Waste (75861 B). W. J. O'Brien and John R. Lindemuth. 4000 w. Jl Ind & Eng Chem—Jan., 1917. Serial, 1st part. Present article is on the composition of garbage.

Industrial Waste Disposal (79762 B). Harrison P. Eddy. 4000 w. Jl Ind & Eng

Chem—July, 1917. Their origin, effects upon waterways, treatment, etc.

Industrial Wastes Disposal (79648 A). Harrison P. Eddy. 5500 w. Met & Chem Eng—July 1, 1917. Discussion of river pollution and methods of disposing of, and recovering trade wastes. Read before Am. Inst. of Chem. Engrs.

Problems in Waste Disposal (80335 A). Henry A. Allen. Ills. 1200 w. A S M E, Jl—Aug., 1917. Factors to be considered; waste situation in Chicago; garbage reduction processes, etc.

Recent Developments in the Design of Municipal Waste Disposal Plants (81236 A). G. R. Tuska. 2500 w. Am Jl Pub Hh—Sept., 1917. Improved processes.

See also Wastes, under INDUSTRIAL MANAGEMENT, *Management*.

# ROADS AND PAVEMENTS

**Aggregates**

Tests of Concrete Road Aggregates (79491 N). J. P. Nash. Ills. 21 pp. Am Soc Test Mat—June, 1917. Reports tests made on concrete in which various coarse aggregates were used, with conclusions.

**Algeria**

Les Travaux D'Ouverture De Routes Et De Chemins (78260C+D). M. Vielle. Ills. 1700 w. Pont Chaus Ann—Nov.-Dec., 1916. Methods and labor of opening roads in Algeria in war time.

**Amiesite**

How an Ameisite Pavement Is Laid (75362). Daniel J. Hauer. Ills. 1500 w. Contr—Dec. 15, 1916. Construction and grading methods in Bethlehem, Pa.

**Asphalt**

Laying Sheet Asphalt in Elizabeth (76476 B). Special No. Ills. 900 w. Mun Jl—Feb. 1, 1917. Use of portable plant for a 40,000-yd. job.

Sheet Asphalt Pavements (76881). T. Linsey Crossley. Ills. 3000 w. Can Engr—Feb. 22 ,1917. The essential parts are considered, tests, inspection, etc.

Stone-Filled Sheet Asphalt Pavement (76774). Charles A. Mullen. Ills. 2200 w. Can Engr—Feb. 15, 1917. Construction in Montreal.

A Logarithmic Aggregate Card and Its Application to Asphaltic Paving Mixtures (77179). C. C. Kennedy. Ills. 1000 w. Eng & Con—March 9, 1917. Diagrams and their use.

Some Relations of the Effect of Overheating to Certain Physical and Chemical Properties of Asphalts (79754 B). A. W. Hixson and Harold E. Hands. 4000 w. Jl Ind & Eng Chem—July, 1917. Investigation to determine to what extent asphalt can be heated and still retain the properties desirable for a durable pavement.

**Asphaltic Oil**

The Sand and Asphaltic Oil Roads of Massachusetts (74363). 2500 w. Eng & Con—Nov. 1, 1916. Information from 1915 report.

**Asphalt Plant**

Remodelling of Civic Asphalt Plant, Ottawa (82103). L. McLaren Hunter. Ills. 1000 w. Can Engr—Oct. 25, 1917. Economy of operation of oil-burning mixer compared with use of coal and other fuels.

**Assessments**

How Davenport Proportions Paving Assessment Benefits (77220). Roscoe E. Sawistowsky. 1000 w. Eng Rec—March 10, 1917. Method devised to eliminate unfairness of the front-foot rule.

**Bituminous**

The Design of Bituminous Pavements (76624 A). Charles Carroll Brown. Ills. 4500 w. Mun Eng—Feb., 1917. Serial, 1st part. Deals particularly with limestone-asphalt rock and sand-asphalt mixture.

Bituminous Roads and Pavements and Treatment (77860). W. R. Farrington. Ills. 5500 w. Br Rds & Sts—April, 1917. Details of construction and maintenance.

Bituminous Macadam Roads (78558). Sam R. Murray. Ills. 2000 w. Br Rds & Sts—May, 1917. Methods of construction and review of history.

**Bituminous Concrete**

Bituminous Concrete Paving in Montclair (75019). 2000 w. Mun Jl—Nov. 30, 1916. Difficulties of hillside location.

**Bituminous Mortars**

Utilization of Bituminous Mortars in the Construction of Bituminous and Block Pavements (80365). S. R. Church. Lecture at Columbia Univ. Ills. 8000 w. Br Rds & Sts—Aug., 1917. The use in road construction and as joint pillars.

**Bituminous Substances**

Observations on the Action of Sulfur Monochloride on Bituminous and Tarry Substances and Hydrocarbon Oils (79755 B). Joseph V. Meigs. Ills. 2500 w. Jl Ind & Eng Chem—July, 1917. Investigations.

**Brick**

Monolithic Brick Paving for Wide Streets (74814). William Robert Paige.

Ills. 1800 w. Eng News—Nov. 23, 1916. Practice in Marshall, Ill.

Specifications for the Construction of Vitrified Brick Country Roads (74387). Ills. 4000 w. Br Rds & Sts—Nov., 1916. Green concrete foundation type; cement grout filler.

The Maintenance of Brick Pavements (74550 A). Ills. 5000 w. Mun Eng—Nov., 1916. Methods producing the best results.

Cost Records of Monolithic Brick Pavements (75498). William Robert Paige. Ills. 2100 w. Eng News—Dec. 28, 1916. Record of cost where brick was laid directly on green concrete.

Brick Pavement on Two-Inch Mortar Base Laid for $1.45½ per Square Yard (75691). P. E. Green. Ills. 4000 w. Eng Rec—Dec. 30, 1916. Saving made in surfacing lightly traveled streets by reducing thickness of the foundation.

Paving Brick, Their Production and Economic Use (75852). Will P. Blair. Read before Am. Assn. of State Highway Officials. Ills. 2500 w. Br Rds & Sts—Jan., 1917. Construction, economic features of the road structure, etc.

The Real Sources of Troubles in Brick Pavements (76584). Maurice B. Greenough. 3300 w. Br Rds & Sts—Feb., 1917. Read before Am Assn for Adv of Sci.

Thin Brick Reduces Paving Costs Nine Cents per Square Yard (76510). Park H. Martin. Ills. 3000 w. Eng Rec—Feb. 3, 1917. Grout used instead of water for moistening cement-sand cushion.

Recent Developments in Details of Construction of Brick Pavements on Green Concrete Foundation and on Sand-Cement Superfoundation (77180). William C. Perkins. Extracts from paper before Am. Assn. for Adv. of Sci. 2800 w. Eng & Con—March 7, 1917. Methods being used.

Latest Developments in Brick Pavement Construction (77862). Fred R. Williams. Ills. 2000 w. Br Rds & Sts—April, 1917. Types in Cleveland and northern Ohio.

Philippine Paving-Brick Materials: A Preliminary Report (77968N). J. C. Witt. Ills. 4000 w. Phil Jl Sci—Sept., 1916. Urgent need for suitabl e paving materials. Search for a clay or shale.

Present Practice in the Construction of Brick Pavements in Chicago (81575 A). H. J. Fixmer. 1800 w. Mun Eng—Oct., 1917. Details of construction.

The Recent Revision of Ideas About Brick Pavement Construction (81576 A). 1500 w. Mun Eng—Oct., 1917. Advantages of monolithic brick pavements; construction features.

**Clinker Mexphalte**

Clinker Mexphalte Roads and Disposal of Refuse Destructor Clinker at Abertillery (75636 A). Lionel D. Lewis. 1200 w. Surv'r—Dec. 8, 1961. Results.

**Combination Roads**

Combination Roads to Sustain Traffic Weight (80951). D. T. Pierce. Ills. 2000 w. Br Rds & Sts—Sept., 1917. Consisting of Portland cement base and asphaltic wearing surface. Wear well.

**Concrete**

Concrete Highway Construction in Contra Costa County, California (75208). Ills. 1200 w. West Eng—Dec., 1916. Details of the work.

Concrete-Road Construction in Michigan (75168). Ills. 1800 w. Eng News—Dec. 7, 1916. Special machinery employed.

New Concrete Pavement in White Plains (75020). J. S. Crandell. Ills. 800 w. Mun Jl—Nov. 30, 1916. "Vitrolithic" pavement.

A Step Toward the Rational Design of Concrete Pavements (76616). S. T. Morse. 3000 w. Eng & Con—Feb. 7, 1917. Causes of cracks, stresses, etc.

Best Practice in Concrete Road Construction (77199). H. Eltinge Breed. Ills. 4000 w. Br Rds & Sts—March, 1917. Read before Am. Road Bldrs. Assn., Boston. Methods based on experience in N. Y. state.

New Methods and Devices for Concrete Pavement Construction (77178). W. M. Kinney. From a paper before Am. Con. Inst. 1800 w. Eng & Con—March 7, 1917. New ideas found useful.

Concrete in Road Building (78111A). George A. Ralph. Ills. 2500 w. Af Eng Soc of Minn, Bul—April, 1917. Conclusions based on extensive examinations.

Maintenance of Concrete Roads (78557). W. Leroy Ulrich. Ills. 2000 w. Br Rds & Sts—May, 1917. Practice in Connecticut.

Finishing Concrete Road and Pavement Surfaces by the Belt Method (80110 A). William F. Long. Ills. 1000 w. Utah Soc Engrs, Jl—June, 1917. Results of two years' experience.

Concrete Roads (80535 A). Abstract of report by H. P. Boulnois. 1800 w. Engr—July 27, 1917. What has been done in America, England and Scotland.

Construction Work on Du Pont Road (80297). Ills. 1500 w. Mun Jl—Aug. 2, 1917. Methods used on road representing latest principles of design and construction for concrete highways.

Pit-Run Gravel Concrete Used for Pavement Sub-Base at London (81023). R. J. Marshall. (Abstract.) Ills. 2000

w. Can Engr—Sept. 6, 1917. Report showing danger of using pit-run gravel of improper proportions without screening and grading.

**Construction**

"Drain! Drain!! and Drain Some More!!!" (75386 A). George C. Warren. 3000 w. E Cb Balt, Jl—Dec., 1916. Refers chiefly to country roads.

Portage Avenue Improvement, Edmonton (76118). C. C. Sutherland. Ills. 2200 w. Can Engr—Jan. 18, 1917. Construction methods.

Progress Report of the Special Committee on Materials for Road Construction and on Standards for Their Test and Use (76063 D). 30 pp. A S C E, Pro—Dec., 1916. General principles.

Engineering Methods Employed on Highway Construction, Winona County, Minnesota (76610). H. B. Childs. 1200 w. Eng & Con—Feb. 7, 1917. Methods of field work and computation.

Industrial Railways in Road Construction (76612). 1500 w. Eng & Con—Feb. 7, 1917. From paper by A. D. Thompson, at Univ. of Illinois. Describes application in Illinois.

Discussion on Progress Report of the Special Committee on Materials for Road Construction and on Standards for Their Test and Use (78319D). 83 pp. A S C E, Pro—April, 1917.

The Type for the Place (77859). Edw. St.C. Smith. Ills. 3000 w Br Rds & Sts—April, 1917 Features to be considered.

**Contracts**

Making a Success of Road Contracting (75772). H. Eltinge Breed. 2200 w. Eng Rec—Jan. 6, 1917. Factors that need attention.

**Convict Labor**

Efficiency and Economy of Convict Labor in Road Construction (76613). Abstract from Bul. U. S. Dept. of Agriculture. 3000 w. Eng & Con—Feb. 7, 1917. Exhaustive investigation.

Experimental Convict Road Camp (76758). George D. Steele. Ills. 2500 w. Eng Rec—Feb. 17, 1917. Model camp in Georgia, with reasons for its successful operation.

**Cost**

How to Determine the Annual Unit Cost of Pavements (77385). W. H. Connell. 2200 w. Eng Rec—March 17, 1917 Analyzes conditions which determine economy.

**Cost Keeping**

Cost-Keeping Forms of Oregon State Highway Commission (78993). 1500 w. Eng & Con—May 30, 1917. Forms and explanation of their use.

**County Roads**

Location and General Surveying for County Roads (78555). F. L. Duffy. Ills. 3500 w. Br Rds & Sts—May, 1917. Essential features.

**Cracks**

The Causes of Cracks in Cement Concrete Pavements (76614). A. T. Goldbeck. From paper before Am. Assn. for Adv. Sci. 2000 w. Eng & Con—Feb. 7, 1917. Causes considered in detail.

**Culverts**

Culverts (77839). Arthur Serdwick. Read before Conf. on Road Construction, Toronto. 1000 w. Can Engr—April 5, 1917. Types, precautions, suggestions, etc.

**Drafting Table**

A Practical Drafting Table for Road Plans (78994). M. W. Watson. Ills. 700 w. Eng & Con—May 30, 1917. Description.

**Drainage**

Road Drainage (74781 A). W. F. Childs, Jr. 3000 w. Corn C E—Oct., 1916. Its importance in road construction. Surface and sub-surface drainage.

Road Drainage (79179). A. H. Hinkle. Ills. 2000 w. Br Rds & Sts—June, 1917. Methods of artificial drainage.

**Dust**

Progress Reports of Experiments in Dust Prevention and Road Preservation, 1915 (75333 N). 71 pp. U S Dept Ag, Bul. 407—Nov. 10, 1916. New experiments and supplementary reports.

Dust Preventatives and Bituminous Binders (77838). G. Cameron Parker. Ills. 1500 w. Can Engr—April 5, 1917. Considers dust palliatives, protective mediums. carpeting mediums. and binders.

**Dust Prevention**

Progress Reports of Experiments in Dust Prevention and Road Preservation, 1915 (74769 N). 70 pp. U S Dept Ag, Bul 407—Nov. 10, 1916. New experiments and supplementary reports on previously reported experiments.

**Earth Handling**

Methods of Handling Earth in Road Construction (78451). Charles R. Thomas. 3800 w. Eng & Con—May 2, 1917. Methods for light excavation and embankment on previously graded old roads.

**Earth Roads**

The Necessity for the Improvement of Roads Other Than the Hard-Surfaced Main Roads (77200). F. E. Schniepfe. Ills. 2500 w. Br Rds & Sts—March, 1917. Construction and maintenance of earth roads.

**Economy**

War-Time Economy in Newport, Isle of Wight (76838 A). E. A. Slater. Ills.

3000 w. Surv'r—Feb. 2, 1917. Economical methods in road work.

**Fillers**

Proportions of Ingredients of Bituminous Mortars Used for Fillers (76615). 1200 w. Eng & Con—Feb. 7, 1917. Conclusions from a paper by Philip P. Sharpless, before Am. Assn. for Adv. of Sci.

**Foundations**

Drainage and Foundations (78559). C. R. Thomas. Ills. 2500 w. Br Rds & Sts—May, 1917. Particularly the relations to highways.

Road Foundations and Drains (78415). R. Crawford-Muir. Ills. Read before conference at Toronto. 3000 w. Can Engr—Apr. 26, 1917. Importance of drainage.

Bituminous Foundations for Sheet Asphalt Surfaces (79365). L. Kirschbraun. Ills. 2500 w. Eng News-Rec—June 21, 1917. Review of the relative values of portland-cement concrete and bituminous concrete.

**Good Roads**

Good Roads and Land Development (78501). Thomas Adams. Read before Can. & Int. Rd. Cong. 2200 w. Can Engr—May 3, 1917. Shows need of planning, designing, and constructing to suit the development.

**Government Roads**

Policy and Program of the Government in Road Construction under New Federal Aid Law (77198). 3500 w. Br. Rds & Sts—March, 1917. Discussion by Col. E. A. Stevens at Boston Good Roads Congress.

**Grades**

Correction of Alignments and Grades in Existing Highways (78413). A. Fraser. Abstract of paper before Can & Intnal Roads Cong. 1800 w. Can Engr—Apr. 26, 1917. General principles for solving the problems.

**Granite**

New Jersey Introduces Small Granite Cubes for State Road Paving (77340). Ills. 1200 w. Eng News—March 15, 1917. Durax pavement used for first time on a country road; Morris turnpike at Summit, N. J.

**Gravel**

Gravel Road Construction and Maintenance in Wisconsin (75718). J. T. Donaghey. Abstract of paper read before Northwestern Road Cong. 2000 w. Eng & Con—Jan. 3, 1917. Materials and methods.

**Gravel Roads**

The Construction of Gravel Roads (79181). William S. Canning. Ills. 4000 w. Br Rds & Sts—June, 1917. Materials and methods discussed.

**Highway Bonds**

Bond Issues as a Source of Revenue for Highway Improvement (79178). E. P. Goodrich. Diagrams. 6500 w. Br Rds & Sts—June, 1917. Lecture at Columbia University. Unfavorable to bond issues.

**Highway Engineers**

A Duty of Highway Commissioners and Highway Engineers as Public Officials (77861). 3500 w. Br Rds & Sts—April. 1917. Moral or business duty, analyzing methods in Michigan.

**Highways**

Cost of Highway Construction in Gila County, Arizona (74548). 1200 w. West Eng—Nov., 1916. Summary of cost-data on highways constructed by day labor.

Highway Conditions in Pioneer Good Roads State Unsatisfactory (74707). 3500 w. Eng Rec—Nov. 18, 1916. New Jersey, after spending $100,000,000, has inadequate system.

Highway Engineering (76167 A). C. E. Gordon, 1500 w. E Cb Balt—Jan., 1917. Requirements for a successful highway engineer, etc.

La Carretera y el Automovil (76204 A). O. A. Acevedo. 2000 w. Soc Cub Ing Rv—Dec., 1916. Construction and maintenance of highways suitable for automobiles in Santo Domingo.

Public Road Mileage and Revenues in the New England States, 1914 (75998 N). 74 pp. U S Dept Ag, Bul 388—Jan. 8, 1917. Shows mileage of improved and unimproved roads, sources and amounts of road revenues, etc.

Public Road Mileage and Revenues in the United States, 1914 (76307). 11 pp. U S Dept Ag, Bul 390—Jan. 12, 1917. A summary.

Road Building in Kane County, Illinois, with County Outfits (75712). George N. Lamb. Ills. 1500 w. Eng & Con—Jan. 3, 1917. Methods and machinery used.

The Highway Situation in Maine 76350 A). Irwin W. Barbour. 1500 w. Corn C E—Dec., 1916. History of state aid for roads, types, construction and maintenance.

Chronological Compendium of Notable Periods and Occurrences in the History and Administration of Highways in England and Wales (77101 N). Thomas Bowes. 2500 w. Instn Mun & Cnty Engrs. Jl—Feb., 1917. Interesting historical summary.

Earth, Sand-Clay, and Gravel Roads (77548 N). Charles H. Moorefield. Ills. 68 pp. U S Dept Ag, Bul. 463—Feb. 21,

1917. Location, design, maintenance, cost, etc.

Highways and Byways (77156 A). Lawrence W. Chubb, with discussion. 9000 w. Roy Soc Arts, Jl—Feb. 16, 1917. Rights of the public on highways of England.

Contractors' Methods Differ on 166 Miles of Highway Work (77852). Ills. 1500 w. Eng News-Rec—April 5. 1917. Conclusions after studying methods of nine contractors.

Maintaining Earth and Clay Roads (77841). A. A. Smith. 20000 w. Can Engr—April 5, 1917. Read before Conf. of Road Construction, Toronto. Location, drainage, surfacing, etc.

Costs of Highway Construction in Oregon (77906A). 1000 w. West Eng—April, 1917. Data from biennial report of John H. Lewis.

Extraordinary Traffic and Excessive Weights on Highways (80111 A). H. T. Wakelam. Read before Instn. Mun. & Co. Engrs. 5500 w. Surv'r—June 29, 1917. Damage to roads by motor omnibuses.

New Specifications of Michigan State Highway Department for Bituminous Concrete Roads (79801). 4000 w. Br Rds & Sts—July, 1917.

Completion of Toronto-Hamilton Highway (80311). Harry Stewart Van Scoyoc. Ills. 1800 w. Can Engr—Aug. 2, 1917. Details of work on last five miles.

1916 Begins Era of Road Expansion (80990). Map. 2500 w. Auto—Sept. 6, 1917. Information concerning new and improved roads in the United States.

**Hauling**

Profit or Loss in Hauling Road-Building Material (78087). A. D. Thompson. 2000 w. Eng News-Rec—April 12. 1917. Relative merits of teams, tractors, motor trucks and industrial railways.

**Impact Tests**

Impact Tests on Brick Paving Slabs Variously Construed (77689). 2500 w. Eng News—March 29, 1917. Symposium on the value of sand and concrete bases, in the light of some recent service tests.

**Improvements**

Comparative Analysis of Economic Effect of Road Improvements in Eight Counties (75146). 3000 w. Eng & Con—Dec. 6, 1916. Exhaustive studies by the U. S. Office of Public Roads.

**Japan**

Japanese Roads and Highway Bridges (79104). J. L. Harrison. Ills. 1500 w. Eng & Con—June 6, 1917. Interesting description.

**Legislation**

A Big Step Forward (77865). 1800 w. Br Rds & Sts—April, 1917. Road legislation in Ohio.

**Macadam**

Maintenance of Macadam Roads With Bituminous Binders (75031). Theron M. Ripley. Ills. 3600 w. Eng News—Nov. 30, 1916. Experience and recommendations of practice.

The Passing and Conservation of Macadam City Streets and Country Roads (75209). George C. Warren. Read before Am. Soc. of Munic Imp. 3500 w. Br Rds & Sts—Dec., 1916. Efficient use.

Building an 8-In. Macadam Pavement with a Tar and Gravel Top (76282). Henry Marshall Olmstead. Ills. 1300 w. Eng News—Jan. 25, 1917. New Jersey road of novel design.

Rebuilding with Permanent Surface Old Macadam Roadways (75706). Charles A. Carruth. 1200 w. Eng News—Jan. 4, 1917. First prize article in recent contest.

Old Macadam of Little Value as Base for Concrete Pavement (77022). D. A. Thomas. Ills. 1100 w. Eng News—March 1, 1917. Experience of the Mich. State Highway Dept.

Tar Macadam on Concrete Base Serves Both Motor and Horse Traffic (77219). P. H. Brigham. Ills. 2000 w. Eng Rec—March 10, 1917. One-inch surfacing proved satisfactory on N. Y. State highway.

**Maintenance**

Road Maintenance in the War Zone of France (81077). William J. Weir. 5000 w. Eng News-Rec—Sept. 13, 1917. Observations of a U. S. highway engineer.

Maintenance and Improvement of Main Roads (74480 A). W. Noble Twelvetrees. 1800 w. Eng Rv—Oct. 16, 1916. Urgent need for action in England.

The Maintenance of Sheet Pavements (74348 A). Julius L. Laxton. 3300 w. E Cb St L, Jl—Sept.-Oct., 1916. Conditions to be considered.

What Are the Road-Maintenance Costs in New York? (74362). Daniel T. Pierce. 700 w. Eng & Con—Nov. 1, 1916. Cost per mile per year on 24 roads.

The Fundamental Necessities in the Maintenance and Upkeep of Streets and Roads (75213). Will P. Blair. 2200 w. Br Rds & Sts—Dec., 1916. Read before Am. Soc. of Munic. Imp.

Earth and Gravel Road Maintenance (77393). A. McGillivray. 3000 w. Can Engr—March 15, 1917. Read before Manitoba Good Roads Assn. Outlines what good maintenance should include.

Method of Maintaining State Aid Roads in Illinois (77177). B. H. Piepmeier. Ills. 1000 w. Eng & Con—March 7, 1917. Work under the "State Aid" law.

**Military Roads**

Military Road Construction at Mt. Gretna, Pa. (80300). Ills. 700 w. Eng & Con—Aug. 1, 1917. Details of operations in opening a new right-of-way. Extensive use of road building equipment.

**Minnesota**

Road Development in Minnesota (81736 N). John H. Mullen. 1100 w. Af Eng Soc of Minn, Bul—Oct., 1917. Accomplishments during the last ten years.

**Modern Traffic**

The Effect of Modern Traffic Upon Urban Roads and Tramway Tracks (81958 A). E. W. Cockerlyne. 2500 w. Surv'r—Sept. 28, 1917. Serial, 1st part. Evils due to mechanical traction, and effect on road construction.

**Motor Highway**

The Automobile's Road Revised (78901). Ills. 800 w. Auto—May 24, 1917. Suggestions for improved design.

**Mountain Road**

Hudson River Road Built on Mountain Side (75701). Eugene Geduldiger. Ills. 800 w. Eng News—Jan. 4, 1917. Difficult sidehill construction.

**Oiled Road**

Oiled Road Through Mojave Desert Built for $950 Per Mile (75932). J. S. Bright. Ills. 1200 w. Eng Rec—Jan. 13, 1917. 8-foot strip treated with 2½ gal. per sq. yd., worked with harrows and rolled.

Oiling Roads in New Jersey (77842). James Logan. Ills. 1500 w. Mun Jl—April 5, 1917. Treatment of water-bound macadam rural highways with light and heavy asphaltic oils.

**Ontario**

Road Laws of Ontario (78751). W. A. McLean. 4000 w. Can Engr—May 17, 1917. The trend of recent legislation.

Street Improvement in Ontario (79630). Ills. 5000 w. Can Engr—June 28, 1917. Report on paving work in 22 cities and 11 towns.

Charts for the Use of Road-Oil Inspectors (81081 A). E. Earl Glass. 300 w. West Eng—Sept., 1917. Charts for facilitating the solution of the ordinary problems connected with road oiling.

**Paris**

Profil En Travers Des Chaussées De Paris (76261 C + D). L. Girard. Illus. 15000 w. Pont Chaus Ann—July-Aug., 1916. Transverse section of Paris pavements. Various considerations; vehicles, pedestrians, water run-off, etc.

**Park Roads**

National Parks Road Construction (78904). J. M. Wardle. Ills. 2500 w. Can Engr—May 24, 1917. Work of a Dominion Government department in the good roads movement.

**Parks**

Methods and Cost of Maintaining 30 Acres of Parks and Boulevards (75714). H. R. Ferris. 1000 w. Eng & Con—Jan. 3, 1917. Report from Victoria, B. C.

**Patching**

Bituminous Concrete (Cold Mix) for Patching Roads (80950). A. H. Hinkle. Ills. 2000 w. Br Rds & Sts—Sept., 1917. Detailed description of the work.

**Pavement Openings**

Present Practice and Regulations Pertaining to Pavement Openings (76611). Arthur H. Blanchard, in paper before Citizens St. Traf. Com., N. Y. City. 1800 w. Eng & Con—Feb. 7, 1917. Present practice in various cities outlined.

**Pavements**

Roadway Pavement Problems on Bridges (78248B). Edward A. Byrne. Ills. 4000 w. Mun Engrs Jl—April, 1917. Pavement of bridges across East River, N. Y.; also other bridges.

Details of Construction of American Wood Block Pavements (79800). A. W. Dow. Ills. 7000 w. Br Rds & Sts—July, 1917. Lecture in Graduate Course at Columbia University.

Street and Road Pavements; Their Design, Construction and Maintenance (79713 A). Ills. 3000 w. Mun Eng—July, 1917. Serial, 1st part. Progress and best practice in concrete road construction.

Present Practice and Regulations Pertaining to Pavement Openings (80881 A). Arthur H. Blanchard. 2000 w. Mun Eng—Sept., 1917. Practice in many cities and conclusions as to general conditions in cities of United States.

**Paving**

Experience in Paving Roads of a Washington County (74373). David H. White. 1900 w. Eng News—Nov. 2, 1916. Various types of pavement; gravel and earth roads.

Old Macadam Resurfaced with Sheet Asphalt in New Haven (76506). W. L. Harlow. Ills. 2500 w. Eng Rec—Feb. 3, 1917. Demands careful preparation of the foundation.

Stone and Concrete Foundations from the Standpoint of Efficiency and Economy (76535). George C. Warren. Abstract of paper before Am. Assn. for Adv. of Sci. 2800 w. Br Rds & Sts—Feb.,

1917. Outlines conditions to be considered.

Water Proof Pavements (76626 A). Ills. 2500 w. Mun Eng—Feb., 1917. Methods used in most modern pavements.

The Contract and Specification for Paving (79180). Charles A. Mullen. Read before Can. Intl. Good Roads Cong. 3000 w. Br Rds & Sts—June, 1917. Relations between contractor and engineer, etc.

The Preparation of Specifications for Paving Materials (79279 A). Carl F. Adam. 3000 w. West Eng—June, 1917. Need of expert investigation of the local situation.

All Cleveland United in Good-Paving Campaign (80302). Nathan C. Rockwood. Ills. 3000 w. Eng News-Rec—Aug. 2, 1917. Account of interest aroused in work of street improvement.

**Paving Costs**

Estimating the Cost of Paved Surface for Highway Improvement (78452). Robert E. Thomas. 1500 w. Eng & Con—May 2, 1917. Method giving reasonable results.

**Paving Materials**

The Importance of Inspection of Paving Materials (80505 A). Carl F. Adam. 2200 w. West Eng—Aug., 1917. Errors made and advantages of inspection by experts.

**Payment Plan**

Funding Company to Promote Water Sales and Sanitation (77384). 1800 w. Eng Rec—March 17, 1917. Installment plan of payment for water and sewer connections.

**Prison Labor**

The Honor System in the Use of Prison Labor in Construction and Maintenance of Public Highways (79799). S. M. Williams. Ills. 2500 w. Br Rds & Sts—July, 1917. Considers it practical and profitable.

**Public Roads**

Public Road Mileage and Revenues in the Central, Mountain, and Pacific States, 1914 (78686 N). 130 pp. U S Dept Ag, Bul 389—May 10, 1917. Showing mileage of improved and unimproved roads; systems of road administration, etc.

**Racetrack**

Cincinnati Motor Racetrack (76820). George C. Mills. Ills. 700 w. Eng News—Feb. 22, 1917. All of wood with 2 x 4-in. sticks for paving.

**Re-Paving**

The Re-Paving of Broad Street, Elizabeth, N. J., with Grouted Granite Block (75853). Thomas E. Collins. 3000 w. Br Rds & Sts—Jan., 1917. Explanation of the work.

**Replacements**

Report of the Committee on Street Paving, on Present Practice Regarding Replacement of Cuts in Pavements (74388). 8000 w. Br Rds & Sts—Nov., 1916. Report at Newark, N. J., meeting of Am. Soc. of Munic. Imp.

**Report Forms**

Weekly Report Forms Simplify Highway Engineers' Work (78346). M. W. Watson. 900 w. Eng News-Rec—April 26, 1917. Standardized sheets used in Illinois.

**Resurfacing**

Methods and Cost of Resurfacing an Old Macadam Road With Rock Asphalt (75145). C. R. Thomas. Ills. 2500 w. Eng & Con—Dec. 6, 1916. Methods developed from experience.

Reclaiming Old Macadam Roadways (76617). Ills. 1000 w. Mun Jl—Feb. 8, 1917. Cost of putting a two-inch surface on a four year old macadam.

Method of Resurfacing Old Macadam Road (79103). Charles R. Thomas. 1700 w. Eng & Con—June 6, 1917. Types of resurfacing, repairing and reconstruction.

**Road Building**

Converting an Old Turnpike Into a Modern Road (74691 A). Daniel. J. Hauer. Ills. 1500 w. Contr—Nov. 15, 1916. Modern methods of building a concrete and asphalt road.

Rock Work on the Storm King Highway, Cornwall, N. Y. (74628). H. L. Hicks. Ills. 500 w. Eng & Con—Nov. 15, 1916. Detail of work.

Road-Building Methods of New York State Criticized; Deputy Commissioners Reply (74831). 4500 w. Eng Rec—Nov. 25, 1916. D. T. Pierce bases comment on inspection. H. E. Breed and F. W. Sarr take issue with statements.

How Office Machinery for Spending a $1,500,000 County Road Bond Issue Works (75057). Ills. 2000 w. Eng Rec—Dec. 2, 1916. Posting graphic report charts. Early checking of extras.

Building 360 Miles of Roads with County Day Labor (77210). J. S. Bright, Jr. Ills. 2200 w. Eng News—March 8, 1917. Methods employed in California.

Contract Road Work (77288 B). R. W. Acton. 3000 w. Af Eng Soc Minn, Bul—1916. Methods of contracting.

Road Problems in the Ozarks (77458 N). Elmo G. Harris. Ills. 15 pp. Univ Mo, Bul—Jan., 1917. Roads in sparsely settled rugged portions of the Ozarks in Missouri.

Goethals to Build Roads (77843). Map & Ills. 1800 w. Auto—April 5, 1917. To reorganize highway system.

Building Roads Through Battles (77844). W. F. Bradley. Ills. 3500 w. Auto—April 5, 1917. Serial, 1st part. Remarkable work of the Italian army in rapid construction.

The Transportation of Materials (77996). George Hogarth. Read before Toronto conference. Ills. 2500 w. Can Engr—April 12, 1917. Suggestions for economical handling of materials and various systems of haulage.

Experiences in a Fen Rural District (78567 A). Arthur W. Broker. 1200 w. Surv'r—Apr. 20, 1917. Difficulties encountered.

Road Construction and Improvement by Means of Town Planning Schemes (78661 A). W. Rees Jeffreys. 6000 w. Surv'r—Apr. 27, 1917. Needs and difficulties, suggesting remedies.

**Road Engineering**

Alignment, Grades, Cross-Sections (79803). W. J. Carrel. 2500 w. Br Rds & Sts—July, 1917. Address to road engineers at the University of Kentucky.

**Road Law**

Influence of Federal-Aid Road Law on Highway Development (75778). A. B. Fletcher. 2500 w. Eng Rec—Jan. 6, 1917. Gives first importance to maintenance.

**Road Machinery**

Machinery on a New York Highway (80298). W. Hardenbergh. Ills. 1500 w. Mun Jl—Aug. 3, 1917. Labor- and time-saving machinery and devices.

**Road Maintenance**

The New Hampshire Patrol System of Gravel Road Maintenance (78454). 2000 w. Eng & Con—May 2, 1917. Information from the Road Patrolmen's Handbook.

**Road Making**

Road-Making Plants in New South Wales (79075 N). 1700 w. Comwh Engr—May, 1917. Their efficiency and cost.

**Road Materials**

Road Material Surveys in 1914 (74973 N). L. Reinecke. Maps & Ills. 285 pp. Can Dpt Ms—Mem. 85. Kinds of country roads and material used.

Methods of Determining the Roadmaking Qualities of Deposits of Stone and Gravel (78503). L. Reinecke. Ills. 2500 w. Can Engr—May 3, 1917. Tests to determine wear and toughness.

Report of Committee D-4 on Road Materials (79476 N). 18 pp. Am Soc Test Mat—June, 1917. Proposed tentative tests and revisions.

**Road Oiling**

Intelligent Use of Road Oil Reduces Maintenance (78913). T. R. Agg. Ills. 1500 w. Eng News-Rec—May 24, 1917. Of little value without good drainage.

Road Oiling in Onondaga County (78352). Eugene W. Bogardus. 2000 w. Mun Jl—April 26, 1917. Details of repairing and oiling methods and appliances used.

Road Oils and Tars (78414). Arthur H. Blanchard. 2800 w. Can Engr—Apr. 26, 1917. Suggested specifications, and the application to broken stone and gravel roads. Read before Can & Int Road Cong.

**Road-Rollers**

The Steam Road-Roller (77928A). Ills. 1200 w. Mech Wld—March 23, 1917. Serial, 1st part. Design of the modern steam roller and the features which require consideration.

**Road Work**

Road Work in Mexico with the Punitive Expedition (78796 C). James A. O'Connor. Ills. 20 pp. Prof Mem—May-June, 1917. Conditions, difficulties and experience in road building.

**Rural Highways**

Alignment and Drainage of Rural Highways (74507). H. E. Bilger. Ills. 2500 w. Eng News—Nov. 9, 1916. Details which make for permanence.

**Rural Roads**

Reducing Rural Road Construction Costs by Increasing Efficiency of Operation (78453. Widmund Huber. Abstract of paper at conference in Toronto. 3000 w. Eng & Con—May 2, 1917. Suggestions for efficiency of operation and of organization.

**St. Louis**

Improved Street System For St. Louis (79631). Andrew Linn Bostwick. Ills. 1500 w. Mun Jl—June 28, 1917. Investigations and proposed solutions.

See also Street Plan, under *Municipal*.

**Sidewalks**

Method and Cost of Grading and Constructing Sidewalks for a Tract Improvement (77820). E. E. Glass. Ills. 1000 w. Eng & Con—April 4, 1917. Concrete walks, curbs and gutters in a hilly suburb.

**Signposts**

Improvements Made in Signposts for Roads (75693). Ills. 2500 w. Eng Rec—Dec. 30, 1916. Data on economical and permanent types.

**Southern States**

Public Road Mileage and Revenues in the Southern States, 1914 (76899 N). 120 pp. U S Dept Ag, Bul 387—Feb. 20, 1917. Showing mileage of improved and unimproved roads, sources of revenues, and systems of administration.

**Springfield, Mass.**

Concrete Paving in Springfield, Mass. (77530). Ills. 900 w. Mun Jl—March 22, 1917. Features of construction.

**Stone Block**

The Design of Stone Block Pavements (75269 A). Charles Carroll Brown. Ills. 2500 w. Mun Eng—Dec., 1916. Serial, 1st part. Modern developments beginning with the cobblestone street.

The Construction and Maintenance of Stone Block Pavements (75946 A). R. Keith Compton. Ills. 4500 w. Mun Eng —Jan., 1917. Latest methods and practice.

**Stone-Gravel**

Stone-Gravel Road Proves Its Usefulness in Michigan (81758). Donald A. Thomas. 1800 w. Eng News-Rec—Oct. 11, 1917. State highway department's specifications also permit use of slag for base and surfacing.

**Storm King Road**

Constructing the Storm King Road (80770). A. C. Perkins. Ills. 1600 w. Mun Jl—Aug. 23, 1917. Methods used on roadway blasted in rock cliff 400 ft. above Hudson River. Protecting railroad from falling debris.

**Street Cleaning**

Health and Sanitation (76854). Gus H. Hanna. 2000 w. Mun Jl—Feb. 22, 1917. Importance of street cleaning service.

Flushing—Its Place in the Street Cleaning Field (77394). Raymond W. Parlin. Ills. 2500 w. Can Engr—March 15, 1917. Discusses particularly hand flushing practice.

Street-Cleansing Methods (77912 A). 2500 w. Surv'r—March 16, 1917. Halifax corporation and the question of control.

**Street Problems**

Fills Versus Viaducts for City Streets (81555 A). Robert E. Cushman. Ills. 1800 w. Ore Soc Engrs, Jl—Sept., 1917. Comparative costs of several types of construction. Based on street problems in the city of Astoria, Ore.

**Streets**

Fundamental Necessities in the Management and Upkeep of Streets and Roads (75302 A). Will P. Blair, with discussion. 13 pp. Cleve Eng Soc, Jl—Nov., 1916. Suggests plan.

**Sweeping Machine**

A New Road Sweeping Machine (80629 A). Ills. 1000 w. Engr—Aug. 3, 1917. Details of machine put on the market by F. Walters & Co., Bilton, Rugby.

**Tar**

The Manufacture of Refined Tar and Its Uses in Road Construction (77285 B). Philip P. Sharples. 2500 w. Af Eng Soc Minn., Bul—1916. Bituminous macadam foundations, penetration methods, etc.

**Texas**

Cost of Engineering an Extensive County Road System (77719). William C. Davidson. 2000 w. Eng Rec—March 31, 1917. Work totaling $1,075,000 and covering 178 miles.

**Tires**

Width of Wagon Tires Recommended for Loads of Varying Magnitudes on Earth and Gravel Roads (76785 N). E. B. McCormick. 1000 w. U S Dept Ag, Circ No. 72—Feb. 12, 1917. Recommendations based on tests.

**Town Planning**

See Road Building.

**Track Pavements**

Pavements in Street Railway and Steam Railroad Tracks (77983). P. L. Brockway. Ills. 2000 w. Mun Jl—April 12, 1917. Solid foundation necessary economy of durable construction.

**Traffic-Census**

Traffic-Census Methods and Some Results; St. Louis (74368). William Holden. Ills. 2200 w. Eng News—Nov. 2, 1916. Methods for extending survey; statistics of vehicles and traffic regulation.

Traffic Census—Its Application to the Design of Roadways, Selection of Pavements and Traffic Regulations (77863). D. B. Goodsell. 2200 w. Br Rds & Sts —April, 1917. Its use in large cities.

**Traffic Control**

Control of Omnibus and Other Motor Traffic (80624 A). H. T. Chapman. 3500 w. Surv'r—July 27, 1917. Report dealing with this subject.

**Waterproofing**

The Necessity for Adequate Methods of Waterproofing in Road Construction (77224). C. J. Morrison. Ills. 1200 w. Can Engr—March 8, 1917. Abstract of paper before Am. Assn. for Adv. of Sci. Shows how necessary it is that roads should be impervious to water.

**Wood Block**

Wood Block Pavements With Reference to Economic and Efficient Wood Preservatives (75212). J. W. Howard. 2500 w. Br Rds & Sts—Dec., 1916. Read before Am. Soc. of Munic. Imp.

Appendix to Report of Committee on Wood-Block Paving (76009 N). Clyde H. Teesdale and John A. Newlin. Ills. 12 pp. Am Wd Pres Assn—Jan., 1917. Influence of proposed treatment on strength and influence of condition of timber.

Report of the Committee on Wood-Block Paving (76273 N). 10 pp. Am Wd Pres Assn—Jan., 1917.

**Wood Block**

Specifications for Creosoted Wood Block Paving (77201). 2200 w. Br Rds & Strs—March, 1917. Revised and adopted by the Am Wood Preserver's Assn, Jan. 25, 1917.

The Treatment of Wood Paving Blocks (78015 A). C. H. Teesdale. Ills. 1500 w. Mun Eng—April, 1917. Factors affecting the durability under varied conditions of traffic.

## WATER SUPPLY

**Accounting**

Pumping Station Cost and Efficiency Records (81665 N). Mark Wolff. 2000 w. Am Wr Wks Assn, Jl—Sept., 1917. Engineering and accounting records described which have been in use in the city of New York for four years.

**Administration**

Some Problems of the Waterworks Executive (77635). Garret O. House. Abstract of paper read before Minn Sec. of Am. W. Wks. Assn. 2500 w. Can Engr—March 22, 1917. Outlines a system that will make for efficiency and economy.

**Analysis**

Making the B. Coli Test Tell More (78911). Milton F. Stein. 2000 w. Eng News-Rec—May 24, 1917. Promises results of more significance to water analysis.

**Aqueducts**

Engineers Condemn Montreal Aqueduct Scheme (74926). 4500 w. Can Engr—Nov. 23, 1916. Committee advises abandoning the scheme.

The Aqueduct for the Greater Winnipeg Water District. W. G. Chace and M. V. Sauer. With supplement: Studies Regarding Concrete Mixtures Employed in the Work. W. G. Chace and D. L. McLean (74597 N). Ills. & Plates. 46 pp. Can Soc C E—Nov., 1916.

Unit Costs and Methods of Construction of Los Angeles Aqueduct (74547). Ills. 3500 w. West Eng—Nov., 1916. Information from recent final report.

Winnipeg-Shoal Lake Aqueduct Construction (74715). Ills. 4500 w. Can Engr—Nov. 16, 1916. Location, design, construction methods of this $13,000,000 gravity pipe line.

Drainage Equipment for the Hudson River Syphon of the Catskill Aqueduct (75235 A). Ills. 2200 w. Engr—Nov. 24, 1916. Detailed description.

Methods and Costs of Construction of Part of Winnipeg Aqueduct (75206). H. L. Tilley. Ills. 1400 w. West Eng—Dec., 1916. Drag-line excavator used; industrial railroad for concrete, etc.

L'Acquedotto Di Ferrara (76903 B). C. Selvelli. Ills. 1600 w. Mon Tec—Dec. 10, 1916. Aqueduct for the city of Ferrara, in northern Italy.

Los Angeles Aqueduct (78797 A). J. B. Lippincott. Ills. 35 pp. Utah Soc Engrs—April, 1917. Detailed description of the aqueduct, its construction and costs.

Report on Enlargement of Montreal Aqueduct (79027). Maps. 5500 w. Can Engr—May 31, 1917. Serial, 1st part. H. E. Vautelet, Arthur St. Laurent, and J. B. McRae discuss merits of five different schemes

The Greater Winnipeg Aqueduct (80470). Charles S. Landon. Ills. 3000 w. Can Engr—Aug. 9, 1917. Methods of construction.

**Booster Station**

The Sioux City Booster Station (77477 N). Philip Carlin. 1200 w. Am Wr Wks Assn, Jl—March, 1917. Details of a successful booster plant.

**Broken Hill**

New Water Supply for Broken Hill, N. S. W. (76389 A). Ills. 1200 w. Engr—Jan. 12, 1917. Details of the extensive works.

**California**

State Water Problems Conference (76321 N). 118 pp. Calif State Print Office—Nov. 25, 1916. Recommendations and suggestions as to legislation.

**Cantonments**

New Jersey's Big Cantonment City Will Have Surface Water Supply (80939). Robert K. Tomlin, Jr. Ills. 1500 w. Eng News-Rec—Sept. 6, 1917. Fine sand and clay at Camp Dix an objection to wells. Pumping plant feeds three-mile force main.

**Catskill Supply**

New York City Water Supply (76186 A). W. J. E. Binnie. From presidential address to Inst. of San. Engrs. 3000 w. Surv'r—Jan. 5, 1917. Serial, 1st part. Details of the work.

**Charges**

The Service Charge—How Constituted (81661 N). J. N. Chester, with discussion. 13 pp. Am Wr Wks Assn, Jl—Sept., 1917. Reply to the Committee on Meter Rates of the New England Water Works Assn.

**Chlorine**

Chlorine as a War Factor (81735 N). William D. Marshall. 1500 w. Am Eb Chem Soc—Oct., 1917. Reviews the uses of chlorine in war service, particularly for sterilizing drinking water in the field, and for hospital use.

**Cleveland, O.**

The Development of the Water System of Cleveland (75301 A). C. F. Shulz. Ills. 25 pp. Cleve Eng Soc, Jl—Nov., 1916. History.

**Color Removal**

On the Nature of Color in Water (77974 D). Thorndike Saville, with discussion. Ills. 45 pp. N E W-Wks Assn Jl—March, 1917. Investigation of the colloidal theory of color in water.

**Conduits**

The Steel Pipe Conduit at Lock Raven, Md. (74780 A). Ezra B. Whitman. Ills. 1200 w. Corn C E—Oct., 1916. Details of pipe and its laying.

L'Alimentation Par Une Seule Conduite De Deux Réservoirs (76264 C + D). Casset. Illus. 1500 w. Automatic valve for controlling supply to two reservoirs, one 36 ft. above the other.

**Connections**

Water Service Connections (78110 A). Garrett O. House. 3500 w. Aff Eng Soc of Minn, Bul—April, 1917. Kinds of material to use, size, maintenance and repairs, etc.

**Coolgardie**

Water Supply in West Australia (78877). 1100 w. Times Eng Supp—Apr. 27, 1917. Coolgardie waterworks scheme. P. V. O'Brien and J. Parr before Inst'n of Civ Engrs.

**Dam Failure**

Failure of the Mammoth Dam (81080 A). Ills. 3500 w. West Eng—Sept., 1917. Official reports.

**Dams**

Drainage-Pump Foundation Design Is Dam Problem (74370). H. L. Hutson. Ills. 1500 w. Eng News—Nov. 2, 1916. Study of soil to prevent underflow and construction to secure stability.

The Sevier Bridge Dam (74664). Clarence S. Jarvis, with discussion. Ills. 2700 w. Utah Soc Engrs—Oct., 1916. History and construction.

Methods of Constructing the Calvaras Hydaulic Fill Earth Dam (75470). G. A. Elliott. Read before San Francisco Assn. of A. S. C. E. 2500 w. Eng & Con—Dec. 20, 1916. Methods employed.

Outlet Control of Elephant Butte Dam (75030). F. Teichman. Ills. 2100 w. Eng News—Nov. 30, 1916. Details of power and service conduits on large irrigation dam.

New Multiple-Arch Dams in the Sierra Nevadas (75432). Ills. 1200 w. Eng News—Dec. 21, 1916. Two large concrete dams at Gem Lake and Agnew Lake.

Worcester's Pine Hill Dam (75440). Ellis H. Custer. Ills. 2500 w. Mun Jl—Dec. 21, 1916. Construction by day labor of a half-million dollar work.

Adding 11 Ft. to Top of Trap-Falls Dam at Bridgeport (75920). Charles A. Hirschberg. Ills. 1800 w. Eng News—Jan. 11, 1917. By adding mass concrete on top and supplying buttresses.

Designing an Earth Dam Having a Gravel Foundation with the Results Obtained in Tests on a Model (76067 D). Ills. 1000 w. A S C E, Pro—Dec., 1916. Continued discussion of James B. Hays' paper.

Talsperrenbau in Spanien (76218 B). O. Sommer. Illus. 1000 w. Schweiz Bau—Dec. 2, 1916. Large dam across a valley in northern Spain for controlling stream flow.

The Austin, Texas, Dam (75947 A). Frank S. Taylor. 4500 w. Mun Eng—Jan., 1917. Design and details of structure replacing dam that failed.

Slide Gates and Needle Valves in the Elephant Butte Dam (76822). F. Teichman. Ills. 2400 w. Eng News—Feb. 22, 1917. Details of operating mechanism and other particulars.

Two Eastwod-Dam Installations in California (76869). John S. Eastwood. Ills. 1000 w. Eng & Min Jl—Feb. 24, 1917. Description and costs of multiple-arch tailings dams.

Build High Earth Dam by Alternate Ridge-and-Wet-Trench Method (77388). Ills. 1200 w. Eng Rec—March 17, 1917. Outlets of cast-iron pipe will carry river during construction in New Mexico.

Coreless Hydraulic-Fill Dam Built of Lava (77690). J. W. Swaren. Ills. 900 w. Eng News—March 29, 1917. Unusual material. Very small leakage reported.

Multiple-Arch Dams on Rush Creek, Califorina (77683 D). L. R. Jorgensen. Ills. 6000 w. A S C E, Pro—March, 1917. Design and construction of two dams that were completed during 1915 and 1916.

Sector Gates at Middle Falls Dam on Genesee River at Rochester (77211). Ills. 2000 w. Eng News—March 8, 1917. Movable gates on new hydro-electric development.

The Reconstruction of the Stony River Dam (77325 D). F. W. Scheidenhelm. Ills. & Plates. 117 pp. A S C E, Pro—Feb., 1917. Reconstruction and strengthening of a dam which failed in Jan.,

1914. History, causes of failure, and treatment.

How to Lay Out Fieldwork and Keep Office Records on Earth-Dam Construction (78513). Selden P. Sears. Ills. 1500 w. Eng News-Rec—May 3, 1917. Phelps Brook dam of the new supply for city of Hartford, Conn., used as an example.

Dams and Water Storage (79944 A). 2200 w. Engng—June 22, 1917. Editorial discussion of water conservation in Canada.

Defiance of Statute and Engineering Law Wrecked Mammoth Dam (79867). H. S. Kleinschmidt. Ills. 2500 w. Eng News-Rec—July 12, 1917. Cause of failure of the Mammoth reservoir dam in Utah.

Multiple-Arch Dams on Rush Creek, California (81467 D). 1500 w. A S C E, Pro—Sept., 1917. Continued discussion of L. R. Jorgensen's paper.

St. Paul-Minneapolis Dam and Locks Are Now Completed (81707). Ills. 1800 w. Eng News-Rec—Oct. 4, 1917. Head of Navigation on the Mississippi moved up 13 miles.

The Reconstruction of the Stony River Dam (81994 D). 14 pp. A S C E, Pro—Oct., 1917. Continued discussion of F. W. Scheidenhelm's paper.

Construction De Barrages-Réservoirs (82029 B). P. Lévy-Salvador. Ills. 3800 w. La Nat—Sept. 22, 1917. Dams for impounding water for hydro-electric undertakings in France.

Island Lake Storage Dam Has Immense Log Sluice (80303). Ills. 2200 w. Eng News-Rec—Aug. 2, 1917. Bear-trap dam of 30 ft. clear width and a crest rise and fall of 20 ft. passes logs.

Multiple-Arch Dams on Rush Creek, California (80667 D). Ills. 7000 w. A S C E, Pro—Aug., 1917. Continued discussion of L. R. Jorgensen's paper.

The Reconstruction of the Stony River Dam (80665 D). 2000 w. A S C E, Pro—Aug., 1917. Continued discussion of F. W. Scheidenhelm's paper.

**Detroit**

The Detroit Water-Works (78077 N). Theodore A. Leisen. 3500 w. Mich Tech—March, 1917. History of growth and development.

**Diesel Engine**

Marine Type of Diesel Engine Adapted to Water Works (78512). Thomas Orchard Lisle. Ills. 1500 w. Eng News-Rec—May 3, 1917. Latest designs for stationary pumping units are to be found in Dutch installations. Many such plants in operation.

**Disinfection**

Chlorine Disinfection in Waterworks Plants (77531). 6000 w. Mun Jl—March 22, 1917. Form, and amount of chlorine used, frequency, and cost in 100 cities. Results.

**Domestic Supply**

Domestic Water Supply Systems (77784). H. F. Boe. Ills. 3500 w. Elec Jl—April, 1917. Hard and soft water systems, pumps, etc.

**Drinking Water**

Pure Water on Interstate Carriers (77075 A). J. O. Cobb, C. L. Williams and H. P. Letton. Ills. 4500 w. Mar Rev—March, 1917. Study of conditions on steam vessels of the Great Lakes.

The Sanitary Drinking Fountain (77478 N). J. H. Dunlap. 1800 w. Am Wr Wks Assn, Jl—March, 1917. Dangers in drinking fountains.

**Explosive Gas**

Explosive Gas in the West Side Tunnel, Before and After the Explosion July 24, 1916 (79346 B). W. J. German, with discussion. Ills. 18 pp. Cleve Eng Soc, Jl—May, 1917. Accident in waterworks tunnel in Cleveland.

**Ecuador**

New Water Supply for Guayaquil (74079 A). Ills. 2500 w. Engr—Nov. 10, 1916. Details of two projects submitted to the government.

**Electrolysis**

Electrolysis (77475 N). Ills. 2800 w. Am Wr Wks Assn, Jl—March, 1917. Discussion of informal address by Albert F. Ganz.

Electrolysis—Troubles Caused Thereby and Remedies Which May Be Applied (80642 D). Albert F. Ganz, with discussion. Ills. 31 pp. N E W-Wks Assn. Jl—June, 1917. Sources and effects of stray currents; remedial measures, etc.

Electrolysis in Underground Water Pipes (81763). Jos. W. Ivy. Abstract of paper before S-W W-Wks Assn. at Topeka, Kan. 3000 w. Can Engr—Oct. 11, 1917. Causes and conclusions.

**Emergency Service**

An Emergency Gang in a Water Service (76057 D). George H. Finneran. 4500 w. N E W-Wks Assn—Dec., 1916. Essentials of emergency service.

**Filter Alum**

Five Water-Works Make Filter Alum (75702). Ills. 2900 w. Eng News—Jan. 4, 1917. Serial, 1st part. Details of Hoover process, with subsidiary articles.

**Filter Plants**

Serious Settlement Destroys Part of New Filter Plant (75171). Ills. 3000 w. Eng News—Dec. 7, 1916. Details of cracking due to settlement of plant as yet unused.

**Filters**

Report of Committee on Recommended Practice for Standardization of Filters (76466 A). 5000 w. A S M E, Jl—Feb., 1917. Report and discussion.

**Filtration**

Operation of St. Louis Filters (74517). Ills. 3000 w. Mun Jl—Nov. 9, 1916. Report of first year's operation.

Periods of Filter Service Increased 250 per cent (74826). J. W. Ellms and S. J. Hauser. Read before Am. Chem. Soc. (condensed). 1500 w. Eng Rec—Nov. 25, 1916. Modified methods at Cincinnati effect economies.

Standards of Mechanical Filtration Plant Performance (74932 A). Abel Wolman. 2500 w. Am Jl Pub Hh—Nov., 1916. Standards suggested are results of a study of Maryland plants.

Cincinnati Method of Agitation of Surface or Filter Beds Lengthens Period of Service (75914). J. W. Ellms and Stephen J. Houser. Read before Am. Chem. Soc. 2000 w. Eng & Con—Jan. 10, 1917. Results of interest to water-works operators.

Development of Filtration Engineering (77524). A. L. Genter. Ills. 33 pp. Utah Soc Engrs, Jl—Feb., 1917. Outlines the development of the most universally adopted methods.

Filters Run Longer When Aëration Reduces Free Carbonic Acid (77045). George C. Bunker. Ills. 2500 w. Eng Rec—March 3, 1917. Tests at Panama-Canal water-purification plant show operating costs can be lowered by changing point of alum application.

Recent Improvements in Vacuum Filtration Plants (77238 N). Thomas B. Stevens. Ills. 3000 w. Cr Min West Anst—Nov., 1916. Describes minor improvements.

Coagulant Apparatus for Rapid Land Filtration (78105 A). Thomas Fleming, Jr. Ills. 20 pp. Corn C E—March, 1917. Importance of automatic control of the chemical. Types described.

The Application of Coagulant Intermittently in Exess Amounts at Springfield, Mass. (77972 D). Elbert E. Lohridge. 1500 w. N E W-Wks Assn, Jl—March, 1917. Conditions and arrangement of plant and details of process.

Multiple Inspirators Aërate Algae-Laden Lake Supply (78507). Ills. 1500 w. Eng News-Rec—May 3, 1917. Filter plant has vortex-whirl apparatus; also underdrain system.

Overcoming Practical Problems in Mechanical Water-Filter Operation (79227). Lewis I. Birdsall. From paper before Am W-Wks. Assn. 2500 w. Eng News-Rec—June 14, 1917.

Operative Methods at the St. Louis Filter Plant (79826 A). C. M. Daily Ills. 17 pp. E Cb St L, Jl—May-June, 1917. Outline of the work accomplished.

The First Slow Sand Filter in the State of Maine (80638 D). Henry Richards, with discussion. Ills. 20 pp. N E W-Wks Assn, Jl—June, 1917. Difficulties encountered and description of plant.

The Principles of Filtration (80527 A). D. R. Sperry. Ills. 3000 w. Met & Chem Eng—Aug. 15, 1917. Verifies the fundamental equation deduced in an earlier article, by an analysis of actual time-discharge curves from a filter.

Some Experiences in Operating the St. Louis Mechanical Filtration Plant (80883 A). 2000 w. Mun Eng—Sept., 1917. Operating methods and experiences at the Chain of Rocks station.

Method and Cost of Rebuilding Filter Beds at Cincinnati Filtration Plant (81752). 1400 w. Eng & Con—Oct. 10, 1917. Abstract of paper by J. W. Ellms, in the last annual report of Cin. W-Wks. Dept. Methods described.

**Fire Protection**

Water Supply and Fire Insurance Rates (77686). 2500 w. Mun Jl—March 29, 1917. Capacities requisite for adequate fire protection.

Report of Committee on Grading Water Works With Reference to Their Value for Fire Protection (77971 D). 40 pp. N E W-Wks Assn, Jl—March, 1917. Report of Nat. Board of Fire Underwriters, N. Y., 1915, with appendix and discussion.

**Flow**

The Flow of Water in Wood-Stave Pipe (77246 A). Ills. 3500 w. Engng —Feb. 23, 1917. Invesigations of F. C. Scobey.

**Flumes**

Irrigating Flume Built with the Cement Gun (80941). Ills. 1500 w. Eng News-Rec—Sept. 6, 1917. Self-supporting flume with 2-in. walls built up on inside forms—130 linear feet per 8-hour shift.

**Forests**

Influence Des Forêts Sur La Régime Des Eaux Courantes (80011 B). A. Bédard. 5000 w. Rev Tri Can—June, 1917. Review of effects of deforestation of watersheds. Many examples cited.

Forestry in Relation to Public Water Supplies (80640 D). J. W. Toumey, with discussion. 20 pp. N E W-Wks Assn, Jl—June, 1917. Calls attention to the possibilities of producing timber on watersheds.

Forests and Rainfall (80723 A). H. R. Mill. 1300 w. Nature—Aug. 2, 1917. Discussion of latest opinions and publications on the effect of destruction of forests on rainfall.

**Freezing**

Freezing of Water in Subaqueous Mains Laid in Salt Water and in Mains and Services Laid on Land (76086 N). William Whitlock Brush, with discussion. 7000 w. Am Wr Wks Assn, Jl—Dec., 1916. To introduce discussion on ice formation.

**Gravity Supply**

Gravity Water Supply Scheme for Calgary (74924). George W. Craig. 1800 w. Can Engr—Nov. 16, 1916. Serial, 1st part. Abstract of report advocating it.

**"Ground Ice"**

"Ground Ice" and Water Supplies (78986 A). James MacAlister. Ills. & Plate. 1500 w. Engng—May 11, 1917. Trouble with anchor ice in the Greenock Corporation waterworks.

**Illinois**

Chemical and Biological Survey of the Waters of Illinois (77676 N). Edward Bartow. Ills. 365 pp. Univ Ill, Bul, Water Sup Series No. 13—Oct. 2, 1916. Report for year ending Dec. 31, 1915.

**Iron Removal**

Experiments on Removal of Iron from Water Supply of Springfield, Ill. (79212). Ills. 1000 w. Eng & Con—June 13, 1917. From paper by G. C. Habermeyer, describing plant and operating results.

**Italy**

I Problemi tecnici dell' Acquedotto Pugliese (81383 C). O. Ramarini. Ills. 4000 w. Soc Ing Arch Ital—Aug. 16, 1917. Serial, 1st part. Difficulties of construction of a new acqueduct in northern Italy.

**Joints**

Experience with Leadite in Jointing Cement-Lined Water Pipe (76087 N). W. H. Buck, with discussion. 1800 w. Am Wr Wks Assn, Jl—Dec., 1916. If handled right, is the most economical material.

**Leakage**

Leakage from Pipe Joints (76059 D). F. A. Barbour, with discussion. 13 pp. N E W-Wks Assn—Dec., 1916. Aims to call out a discussion on whether investigation is worth while.

Joint Leakage in Vitrified Pipe Line (80349). William W. Brush. Ills. 2000 w. Mun Eng—Aug., 1917. Experimental work and field results on Staten Island.

**Lime**

Recovery of Spent Lime at the Columbus Water Softening and Purification Works (76081 N). Charles P. Hoover, with discussion. Ills. 2000 w. Am Wr Wks Assn, Jl—Dec., 1716. Plan of recovery.

**Locating Water**

The Divining Rod (77265). Arthur J. Ellis. Ills. 50 pp U S. Geol Surv—. Water-Supply paper 416. History of water witching, with a valuable bibliography.

**Lock Gates**

L'Électrification Des Treuils De Manœuvre Des Portes Et Des Vannes De L'Écluse (76255 C + D). Lombard. Ills. 5900 w. Pont Chaus Ann—May-June, 1916. Electric motors for windlasses on lock gates and screens.

**London Supply**

Water Research (77012 A). 3000 w. Engr—Feb. 9, 1917. Summary of matters discussed in Dr. A. C. Houstens last report on investigations of water supply of London.

**Madras**

Madras Water and Drainage Works (76187 A). 1500 w. Surv'r—Jan. 5, 1917. Proposed works.

**Mains**

Planning Water Supply Mains (76284). 2000 w. Mun Jl—Jan. 25, 1917. How to plan for supplying any section for fifty years with minimum expenditure for pipe.

Cement Joints for Cast-Iron Water Mains (77684 D). Clark H. Shaw. Ills. 2000 w. A S C E, Pro—March, 1917. Method of making successful cement joints.

Cement Joints for Cast Iron Water Mains (78839 D). Ills. 4000 w. A S C E, Pro—May, 1917. Discussion of Clark H. Shaw's paper.

Troubles in Constructing a 48-inch Submerged Main (79160). F. W. Cappelin. Ills. 2500 w. Can Engr—June 7, 1917. Cost details of shafts and tunnels. Read before the Am. Water-Works Con.

Breaks in Water Mains (80641 D). S. E. Killam, with discussion. Ills. 12 pp. N E W-Wks Assn, Jl—June, 1917. Causes and means of prevention. Accounts of breaks in a supply for Boston and surroundings.

Cement Joints for Cast-Iron Water Mains (80666 D). 1500 w. A S C E, Pro—Aug., 1917. Continued discussion of Clark H. Shaw's paper.

Troubles in Constructing a 48-Inch Submerged Main (81666 N). F. W. Cappelen. 1800 w. Am Wr Wks Assn, Jl—Sept., 1917. Crossing the Mississippi at Minneapolis.

**Maintenance**

Road Maintenance (81790). W. W. Crosby. 2500 w. Br Rds & Sts—Oct., 1917. Problems of maintenance.

**Massachusetts**

Surface Water of Massachusetts (75151 B). C. H. Pierce and H. J. Dean. Ills. & Maps. 425 pp. U S Geol Surv—Water Sup. paper 415. Topography, hydrometric work, etc.

**Meters**

The Use of Water Meters (77484 N). J. C. Beardsley. 1800 w. Am Wr Wks Assn, Jl—March, 1917. Discussion of advisability of metering all taps.

The Economy of Meters (81667 N). C. L. Köhn. 1000 w. Am Wr Wks Assn, Jl—Sept., 1917. Results at Elgin, Ill.

**Mineral Waters**

Mineral Waters in 1915 (74399 N). Richard B. Dole. 37 pp. U S Geol Surv, II:23—Oct. 31, 1916. Statistics of output and value, trade, etc.

**Municipal Supply**

Recent Progress and Tendencies in Municipal Water Supply in the United States (81659 N). John W. Alvord, with discussion. 7000 w. Am Wr Wk Assn, Jl—Sept., 1917. Review and progress.

Il Servizio D'Acqua Potabile in Milano (82008 B). A. Manfredini. 1500 w. Mon Tec—Sept. 10, 1917. History of project for supplying Milan with pure water.

**Ottawa**

Water Distribution System, Ottawa (76353). L. McLaren Hunter. Ills. 600 w. Can Engr—Jan. 25, 1917. Construction and cost.

**Parkersburg, W. Va.**

The Water Supply of Parkersburg, W. Va. (76298 D). William M. Hall. Ills. 38 pp. A S C E, Pro—Jan., 1917. Process of selecting a new supply. Novel method adopted.

**Pipe Line Cost**

Bids Asked Before Bonds Were Voted to Show That Estimate Represented Real Cost of Pipe Line (75178). H. A. Rands. Ills. 2000 w. Eng Rec—Dec. 9, 1916. $25,000 refunded to Oregon City, Ore., water department on completion of project.

**Pipe Lines**

Construction of Vitrified Pipe Lines (78553 A). J. F. Springer. Ills. 4500 w. Mun Eng—May, 1917. Details of construction.

Air Tanks on Pipe Lines (80656 D). Minton M. Warren. Ills. 13 pp. A S C E, Pro—Aug., 1917. Utility on long pipe lines, their disadvantages, principles involved, etc.

Air Tanks on Pipe Lines (81997 D). 900 w. A S C E, Pro—Oct., 1917. Discussion of Minton M. Warren's paper.

**Pipe Sizes**

Determining Pipe-Main Sizes (79276). Alfred Iddles. 700 w. Power—June 19, 1917. Chart, and its use.

**Piping**

House Service Piping (75811 B). Ills. 1500 w. Prac Eng, Chi—Jan. 1, 1917. Details of systems for hot water, air washing, drinking water, etc.

Water Piping (75808 B). 1500 w. Prac Eng, Chi—Jan. 1, 1917. Determining size. Velocity, capacity and friction.

**Plant Units**

Useful Life of Water Works Units (79215). 1500 w. Eng & Con—June 13, 1917. Summary from report of Am. W. Wks. committee.

**Pollution**

Tests for Bacillus Coli as an Indicator of Water Pollution (76084 N). C.-E. A. Winslow, with discussion. 6500 w. Am Wr Wks Assn, Jl—Dec., 1916. Methods of testing and their value.

Finding and Stopping Pollution of Austin Water Supply (80678). Julian Montgomery. 1600 w. Eng News-Rec—Aug. 23, 1917. Surface drainage and lack of sewers cause of infection.

**Port Arthur, Ont.**

Water Supply of the City of Port Arthur. (74598 N). L. M. Jones. Plates. 22 pp. Can Soc C E—Nov., 1916. History and description.

**Portland, Maine**

The Water Supply of Portland, Maine (80636 D).. David E. Moulton. 3000 w. N E W-Wks Assn, Jl—June, 1917. History and description of the water supply system.

**Potable Water**

Color Records Applied to Potable Water (80379 A). J. S. Pickering. Read before Instn. Water Engrs. Ills. 4000 w. Surv'r—July 6, 1917. Results of color-tests made of water containing the organism *crenothrix*, suggesting the adoption of a suitable standard for determining color.

**Pumping**

Pumping in the Metropolitan Water District of Massachusetts (79235). A. O. Doane. 3500 w. Can Engr—June 14, 1917. Read before Am W-Wks Assn. Synopsis of coal specifications. Results.

Meeting Increased Demands (81106). Ills. 1500 w. Prac Eng, Chi—Sept. 15, 1917. Twelve-million gallon pumping unit added to station of Sheboygan, Wis., water-works.

**Pumping Engines**

Duty Trials on Pumping Engines at John Street Station, Toronto (79388). Robert W. Angus. Ills. 3000 w. Can

Engr—June 21, 1917 From report made by R. C. Harris. Details of the trials.

**Pump Tests**

Endurance-Efficiency Pump Tests (79273). L. A. Quayle. Ills. 1200 w Power—June 19, 1917 Data of tests on four motor-driven, centrifugal, high-pressure, fire service pumps.

Test of a 1,000,000-Gallon Motor Driven Centrifugal Pump (79238). S. R. Blakeman. Read before Am. W-Wks. Assn. 1500 w. Prac Eng, Chi—June 15, 1917. Results obtained at Dyersburg, Tenn.

**Pure Water**

Pure Water—The Employer's Liability (79458 A). George A. Johnson. 1500 w. Ind Man—July, 1917. Danger from polluted water, and employer's responsibility in protecting workers.

**Purification**

Reaëration Held to Be Important in Self-Purification of Streams (74705). 2200 w. Eng Rec—Nov. 18, 1916. Prof. Earle B. Phelps holds that dilution ratio is not the essential factor.

Water Purification in America (75918). George A. Johnson. Abstract of paper read before Am. Assn. for Adv. of Sci. 2200 w. Eng & Con—Jan. 10, 1917. Reviews the progress, especially since 1910.

Recent Practice in the Purification and Softening of Public Water Supplies (77006 A). Fred C. Uren. Ills. From paper read before Instn. Civ. Engrs. of Ireland. 3000 w. Surv'r—Feb. 9, 1917. Serial, 1st part. Ills. Filtration methods.

Some Notes on the Operation of the Miraflores Purification Plant, Canal Zone (77333). George C. Bunker, in annual report ending June 30, 1916. 3000 w. Eng & Con—March 14, 1917. Results of first year's operation.

Treatment of Missouri River Water at Council Bluffs, Iowa (77479 N). J. B. Thornell. Ills. 2000 w. Am Wr Wks Assn, Jl—March, 1917. Purification method by coagulatien and sedimentation, followed by treatment with chlorine.

Re-Aeration as a Factor in the Self-Purification of Streams (77813 B). Earle B. Phelps. 3000 w. Jl Ind & Eng Chem —April, 1917. Basic principles of reaeration, importance of oxidation data, etc.

Water Purification by Liquid Chlorine (77919 A). Ills. 3000 w. Engr—March 16, 1917. Details of apparatus for delivering chlorine gas in regulated quantity for the purification of water supplies.

La Stérilisation De L'Eau (78266 B). 2700 w. Ind Elec—March 10, 1917. Water sterilization by electricity. Application of the ozone process as used in foreign countries.

The Water Purification and Softening Plant of Fargo (78685 B). F. L. Anders. 3000 w. N Dak Soc Engrs, Pro—1917. Plant and results obtained.

Operating Results of Plant for Removal of Iron and Manganese from Ground Waters at Lowell, Mass. (79213). 1000 w. Eng & Con—June 13, 1917. From a paper by Frank A. Barbour.

Value of Laboratory Control of Operation of Water Purification Plants (81668 N). 1800 w. Am Wr Wks Assn, Jl—Sept., 1917. Discussion at a meeting of the Illinois section at Urbana.

**Quality**

The Quality of Water and Confirmatory Tests for B. Coli (81629). Abel Wolman. 1500 w. Can Engr—Oct. 4, 1917. Comparison of condition of water with percentage of tubes confirmed, etc.

**Quebec**

Eau d'Alimentation Dans les Municipalités du Québec de Plus de 5000 Ames (75576 B). T. J. Lafrenière. 3300 w. Rev Tri Can—Nov., 1916. Water supply in Canadian cities of more than 5000 population.

**Rainfall**

Rainfall Data Interpreted by Laws of Probability (75497). Thorndike Saville. Ills. 3900 w. Eng New—Dec. 28, 1916. Application of probability methods to rainfall problems.

**Rate Making**

The Relation of the Railroad to the City Water Plant (81662 N). C. R. Knowles, with discussion. 2100 w. Am Wr Wks Assn, Jl—Sept., 1917. The subject of differential treatment of customers and rate making.

**Red Water**

Carbon Dioxide and Iron in Water Supplies (78592). C. G. Wiglay and P. N. Daniels. Ills. 1700 w. Eng & Con—May 9, 1917. Two instances of red water troubles and methods utilized to improve the quality.

**Reservoirs**

Some Design Features of the 3,500,000-Gal. Reinforced Concrete Reservoirs for Lansing, Mich. (74524). Ills. 1000 w. Eng & Con—Nov. 8, 1916.

Reservoir Capacity Increased and Construction Cost of Dam Decreased by Hydraulic Sluicing (75182). Ills. 1200 w. Eng Rec—Dec. 9, 1916. Waterworks system at Athens, Ga. Saving in operating cost resulting from new sources of supply.

The Cross Hill Covered Service Reservoir for the Birkenhead Waterworks (75646 A). W. J. E. Binnie, with discussion. Ills. 8500 w. Surv'r—Dec. 15,

**1916. Read before the Instn. of Water Engrs. Detailed description.**

**Dry Reservoir for Flood Control on the Oder River in Germany (76824). Kenneth C. Grant. Ills. 1200 w. Eng News —Feb. 22, 1917. The Buchwald reservoir, having concrete dam.**

**A Small Concrete Lined Reservoir (77506 A). Edward R. Stapley. Ills. 1500 w. Corn C E—Feb., 1917. Economical methods of construction and design. Difficulties, etc.**

**Excavating a Reservoir at Pott's Hill, Sydney (77049 N). Ills. 1500 w. Comwh Engr—Feb., 1917. Steam shovel plant and its capabilities.**

**The Construction and Reconstruction of Compton Hill Reservoir (77319 A). Gurdon G. Black. Ills. 38 pp. E Cb St L, Jl—Jan.-Feb., 1917. Outlines history of St. Louis waterworks and gives details of work on reservoir.**

**Storage Reservoirs as a Factor in the Purification of Surface Works 77808 B). S. T. Powell. 1500 w. Jl Ind & Eng Chem—April, 1917. Value as a preliminary method of purification prior to ozone sterilization.**

**Thermocline Studies at Kensico Reservoir (77806 B). Frank 2. Hale and John E. Dowd. 3000 w. Jl of Ind Eng Chem—April, 1917. Treatment of the reservoir bottom, complete analyses, etc.**

**The Design and Construction of a Reinforced Concrete Covered Reservoir (79129 A). H. F. Blomquist. 2000 w. Af Eng Soc of Minn, Bul—June, 1917. Deals particularly with features upon which opinions differ**

**Covered Reservoir of Reinforced Concrete (79898). Slightly abbreviated from a paper by H. F. Blomquist. Ills. 2000 w. Mun Jl—July 12, 1917. Details of design and construction of a circular reservoir with conical roof at Mankato, Minn.**

**Lansing Concrete Reservoirs (80998). F. G. Gordon. Ills. 1200 w. Mun Jl—Sept. 6, 1917. Novel details in design and construction methods.**

**Reconstructing Compton Hill Reservoir (80999). Ills. 3000 w. Mun Jl—Sept. 6, 1917. The water supply of St. Louis. Increases capacity; waterproofing with asphalt membrane, etc.**

**Reservoirs of the Cypress Hills District (81099). F. H. Peters. Abstract of paper before W. Can. Irr. Assn. 2800 w. Can Engr—Sept. 13, 1917. Indicates reservoir developments that would give an assured water supply for irrigation purposes.**

**See also same heading under Electrical Engineering, *Generating Stations*.**

**St. Paul**

**Installing and Maintaining Water Service Connections in St. Paul (80880 A). Garrett O. House. 2500 w. Mun Eng—Sept., 1917. Methods used, repairs, thawing, etc.**

**San Diego**

**Repairing Flood Damage to San Diego Water System (75018). A. C. Francis. Ills. 2000 w. Mun Jl—Nov. 30, 1916. Methods adopted in securing and safeguarding an emergency supply.**

**Sanitation**

**Sanitation with the British Expeditionary Force in France (75637 A). N. W. Hoskins. Ills. 2500 w. Surv'r—Dec. 8, 1916. Serial, 1st part. Details of the sanitary arrangements.**

**Sault Ste. Marie**

**Saulte Ste. Marie Water Supply Project (79924). R. O. Wynne-Roberts. Plans. 3500 w. Can Engr—July 12, 1917. Investigation of five possible schemes. Favors gravity supply from Coldwater Creek.**

**Saving Coal**

**Saving Coal in the Waterworks Pumping Station (79993). Milton F. Stein. 1700 w. Mun Jl—July 19, 1917. How to prevent losses in the boiler plant.**

**Service Charges**

**Service Charges—How Constructed (79216). 2000 w. Eng & Con—June 13, 1917. From paper by J. N. Chester. Discussion of conclusions of committee on meter rates of the New England W. Wks. Assn.**

**Service Connections**

**The Fallacy of Extending Service Connections to the Curb Line Previous to Paving (77485 N). John Wilson. 1200 w. Am Wr Wks Assn, Jl—March, 1917. Suggests a better plant in the author's opinion.**

**Sioux Falls, S. D.**

**Water-Works Improvements at Sioux Falls, S. D. (74371). Ills. 2100 w. Eng News—Nov. 2, 1916. New reservoir.**

**Siphon**

**An Inverted Siphon in a Suction Line (77483 N). Karl C. Kastberg. 1200 w. Am Wr Wks Assn, Jl—March, 1917. Natural phenomena responsible for the performance of liquids.**

**Softening**

**Growth of Filter Sand at Three Water-Softening Plants (78510). 2000 w. Eng News-Rec—May 3, 1917. Serial, 1st part. History and experiments at Columbus, O., Grand Rapids, Mich., and McKeesport, Penn.**

**Sterilization**

**Hypochlorite Sterilization of London Water (75635 A). A. C. Houston. 6500**

w. Surv'r—Dec. 8, 1916. Laboratory and out-door experiments, treatment, etc.

Water Sterilization by Means of Chloramine (77330). Joseph Race. 1500 w. Eng & Con—March 14, 1917. Results of experimental study.

The Interaction of Chloride of Lime with the Normal Constituents of Natural Waters and Sewage (81343 N). George W. Heise. Ills. 17 pp. Phil Jl Sci—Jan., 1917. Study of the decomposition rate of chloride of lime in sewage.

The Chlorine Cell Installation of the Montreal Water and Power Company (81664 N). F. H. Pitcher and James O. Meadows, with discussion. Ills. 9 pp. Am Wr Wks Assn, Jl—Sept., 1917. Production of electrolytic chlorine and application of the gas.

**Storage**

Storm Water Storage in Texas (76023 A). J. C. Nagle. 3000 w. Corn C E—Nov., 1916. Present and proposed developments, uses, etc.

**Submerged Tubes**

Experiments with Submerged Orifices and Tubes (74366). T. C. Rogers and T. L. Smith. Ills. 1900 w. Eng News—Nov. 2, 1916. New law indicated covering relation between length of tube and discharge coefficient.

**Supply**

A New Raw Water Supply for the City of McKeesport, Pennsylvania (76085 N). E. C. Trax. 4500 w. Am Wr Wks Assn, Jl—Dec., 1916. Circumstances that led to the abandonment of the Youghiogheny and adoption of the Monongahela as a source of supply.

Surface Water Supply of the United States, 1913—Pacific Slope Basins in California (75995). Nathan C. Grover, H. D. McGlashan, and F. F. Henshaw. Ills. 500 pp. U S Geol Surv—Water Sup. paper 361. Eleventh of a series of twelve reports on results of measurements.

Developing a Supply by Tapping Water-Bearing Strata with Tile Pipe Lines (76718). L. U. Martin. 1700 w. Eng & Con—Feb. 14, 1917. Work at Glenwood, Minn.

Wappingers Falls Water Supply (76742). Henry W. Taylor. 1500 w. Mun Jl—Feb. 15, 1917. Arrangement between village and local manufacturing company for securing supply.

Water Supply of Parkersburg (76748). Ills. 2500 w. Mun Jl—Feb. 15, 1917. Water obtained from a sand bar in the river.

The Water Supply of Parkersburg, W. Va. (77685 D). 10800 w. A S C E, Pro—March, 1917. Discussion of Willliam M. Hall's paper.

The Water Supply of the Quad Cities (77482 N). Martin R. Carlson. 2000 w. Am Wr Wks Assn, Jl—March, 1917. Water works of Davenport, Iowa, Rock Island, Moline and East Moline, Illinois.

Planning the Distribution of the Water Supply of a Small Town (77637). M'Kean Maffitt. 2800 w. Can Engr—March 22, 1917. Method of distribution, pumping machinery, mains, hydrants, etc.

The Water Supply of Parkersburg, W. Va. (78315 D). Maps. 28 pp. A S C E, Pro—April, 1917. Continued discussion of William M. Hall's paper.

The Sale of City Water to Railroads (77835). C. R. Knowles. 1500 w. Ry Age Gaz—April 6, 1917. Favors differential treatment of consumers.

Recent Progress in Water Supply (79222). Abstract of paper by John W. Alvord before Am. W.-Wks. Assn. 3000 w. Mun Jl—June 14, 1917. Advance made in the last decade in improving the quality.

Some Problems of Water Supply Sanitation in New Hampshire (80639 D). Charles D. Howard. 10 pp. N E W-Wks Assn, Jl—June, 1917. Review of the principal supplies and methods of treatment where necessary.

The Water Supply of Madison, Anson, and Embden, Maine (80637 D). Lewis L. Wadsworth, with discussion. 3000 w. N E W-Wks Assn, Jl—June, 1917. Details of the plant and the system adopted.

The Water Supply of Parkersburg, W. Va (80664 D). 1700 w. A S C E, Pro—Aug., 1917. Continued discussion of William M. Hale's paper.

The Water Supply of Parkersburg, W. Va. (81471 D). 1200 w. A S C E, Pro—Sept., 1917. Continued discussion of William M. Hall's paper.

**Surge Tanks**

Surge-Tank Problems Solved by New Methods (75465). A. G. Hillberg. 1500 w. Eng Rec—Dec. 23, 1916. Simplified analysis makes use of calculus unnecessary.

**Swimming Pools**

Swimming Pool Operation (77481 N). Jack J. Hinman, Jr. 17 pp. Am Wr Wks Assn, Jl—March, 1917. Design, use, infection, remedies, etc.

**Tanks**

Six-Post Water-Tower Tank (74514). Ills. 1600 w. Eng News—Nov. 9, 1916. Steel tower and tank at Wheaton, Ill.

**Treatment**

Some Results of the Treatment of the Baltimore Drinking Water by Calcium Hypochlorite (74934 A). William Royal Stokes and Frank W. Hachtel. 3000 w.

Am Jl Pub Hh—Nov., 1916. Best temporary method for treatment.

Water Treatment in the Canal Zone 78146). Ills. 3500 w. Mun Jl—April 19, 1917. Interesting problems due mainly to climatic conditions.

**Tunnels**

Cleveland's New Water-Intake Tunnel Under Lake Erie Completed (76074). Ills. 4800 w. Eng News—Jan. 18, 1917. Details of 3-mile tunnel under Lake Erie.

Methods of Driving Pine Mountain Tunnel and Comparison With Other Tunnels (79796). H. Devereux. Ills. 2500 w. West Eng—July, 1917. Part of a water-supply project in California. Costs given.

**Valuations**

Costs of Preparing Valuations for Small Water Companies (79866). Allen F. Brewer, Jr. 2000 w. Eng & Con—July 11, 1917. Cost data and helpful suggestions for lessening expense.

A Discussion of the Fundamental Principles of Water-Works Valuation (81642 A). J. W. Ledoux. 6000 w. E Cb Phila, Jl—Oct., 1917. Three methods of valuation and cases to which they are applicable.

Purposes Should Govern Water-Works Valuations (81708). J. W. Ledoux. 2500 w. Eng News-Rec—Oct. 4, 1917. Original cost, reproduction cost less depreciation and market value are all thought to have their applications.

Reasonable Limits of Accuracy for Valuation of Water Utility Properties (81753). Allen F. Brewer. 1300 w. Eng & Con—Oct. 10, 1917. Suggests keeping a detailed file of all cost data to use in future appraisals.

**Wales**

Ystradfellte Waterworks (80967 A). D. M. Davies. Ills. 3000 w. Surv'r—Aug. 10, 1917. Serial, 1st part. Details of storage reservoirs.

**Waste**

The Use and Waste of Water (75395 A). G. B. Williams. 3500 w. Surv'r—Dec. 1, 1916. Calcutta's high consumption.

**Water Analysis**

Some Problems of the State Water Laboratory (76082 N). L. H. Van Buskirk, with discussion. 4500 w. Am Wr Wks Assn, Jl—Dec., 1916. Sanitary analysis; methods; value, etc.

**Water Departments**

I. Relations Between Water Departments, Companies and the Public. W. C. Hawley. II. Relations Between a Water Department and the Public. A. A. Reimer (81660 N). 12 pp. Am Wr Wks Assn, Jl—Sept., 1917. Two papers discussing the difficulties.

**Water Hammer**

Pulsations in Pipe Lines, as Shown by Some Recent Tests (81991 D). H. C. Vensano. Ills. 50 pp. A S C E, Pro—Oct., 1917. Describes experiments and measurements in long pipe lines, with detailed results.

**Water-Meters**

Water-Meters in Their Sanitary Relations (77810 B). Henry Leffmann. 2200 w. Jl Ind & Eng Chem—April, 1917. Prevention of water waste.

**Water Resources**

Manitoba Hydrometric Survey for the Calendar Year 1915 (79809 N). M. C. Hendry. Ills. & Maps. 266 pp. Can Dept of Int—Water Resources paper No. 19.

Report of the British Columbia Hydrometric Survey for the Calendar Year 1915 (79808 N). R. G. Swan. Ills. & Maps. 436 pp. Can Dept of Int—Water Resources paper No. 18.

**Watersheds**

Photogrammetry for Taking Topography of Watershed (74510). Douglas H. Nelles. Ills. 1800 w. Eng News—Nov. 9, 1916. With a description of a simple plotting device.

I. Protection of the Watershed of the Newark Water Works. Morris R. Sherrerd. II. Sanitation of the Croton Watershed. T. D. L. Coffin. III. Sanitation of the Rockaway River Watershed. Charles F. Breitzke. IV. The Sanitation of Watersheds (77474 N). Ills. 37 pp. Am Wr Wks Assn, Jl—March, 1917. Three papers discussed together.

**Water Softening**

Results of Nine Months' Operation of a Water Softener at the Pumping Station of Springfield, O. (75916). S. P. Applebaum. 1000 w. Eng & Con—Jan. 10, 1917.

**Water System**

A Forty-five-City Water System (78505 B). Ills. 1500 w. Mun Jl—May 3, 1917. (Special.) Details of plant of the Hackensack Water Co.

**Water-Tightness**

Water-Tightness of the Corpus Christi Pipe Line (76716). Alexander Potter. 900 w. Eng & Con—Feb. 14, 1917. Details of pipe line and results of tests under pressure.

**Water-Tower**

The Design and Erection of a Water-Tower, St. George's Hills, Surrey (81192 N). Arthur Trenchard Hill. Ills. 2000 w. Instn C E, No. 4181—1916. Details.

**Water Tunnel**

Economical Handling of Materials in Cleveland Water Tunnel (78016 A). Iverson C. Wells. Ills. 1200 w. Mun Eng—April, 1917. Methods used in building a water tunnel more than three miles into Lake Erie.

**Water Waste**

Seepage Water, Formerly Wasted, Now Pumped for Irrigation (78348). Julius Hornbein. Ills. 1500 w. Eng News-Rec—April 26, 1917. Drainage from Idaho bench lands.

**Waterworks**

New Westminster Waterworks Construction (74925). J. W. B. Blackman. Ills. 4000 w. Can Engr—Nov. 23, 1916. Serial, 1st part. Designs, materials and methods.

Restoring Flood-Wrecked Well and Pumping System (74815). A. C. Francis. Ills. 1500 w. Eng News—Nov. 23, 1916. Work necessitated by the flood at San Diego.

Wood stock Waterworks (75665). R. O. Wynne-Roberts. Ills. 1500 w. Can Engr—Dec. 28, 1916. Special reference to water level alarm and valve for controlling main delivery.

Makawao Water-Works for Rural Supply (76823). Joel B. Cox. Ills. 2400 w. Eng News—Feb. 22, 1917. A high-head water works for Hawaiian community.

Waterworks Development, Welland, Ontario (76664). D. T. Black. Ills. 1500 w. Can Engr—Feb. 8, 1917. History, and description of pumping station.

Peterborough Waterworks (77050). R. O. Wynne-Roberts. Ills. 1200 w. Can Engr—March 1, 1917. Details of plant and pumping equipment.

Some Observations Upon Public Regulation of Water Works (77476 N). Leonard Metcalf. 11 pp. Am Wr Wks Assn, Jl—March, 1917. Reviews the present outlook after a decade of commission control. Results of this experience. Comments.

Some Problems of the Water Works Executive (77480 N). Garrett O. House. Chart. 3000 w. Am Wr Wks Assn, Jl—March, 1917. Qualifications; organization chart of St. Paul, and problems involved.

New Reservoir and Water Mains Improve Service at Covington, Va. (78508). Harry Stevens. Ills. 1500 w. Eng News-Rec—May 3, 1917. Details of work.

New Water-Works at Providence, R. I., to Cost $12,000,000 (78506). Frank E. Winsor. Ills. 2500 w. Eng News-Rec—May 3, 1917. Reservoir formed by earth dam 100 ft. high. Low construction cost and other advantages.

The Work of the Service Force of the Water Works Department of Minneapolis (78593). J. A. Jensen. 3500 w. Eng & Con—May 9, 1917. Work due to climatic conditions.

Forty-five Years' Experience in Water Works (81663 N). E. E. Davis. 1500 w. Am Wr Wks Assn, Jl—Sept., 1917. Troubles encountered with fire hydrants, pipes, pumps, etc.

**Watford**

The New Water Supply and Other Municipal Works at Watford (74977 N). David Waterhouse. Ills. 30 pp. Instn Mun & Cnty Engrs—Nov., 1916. Detailed description of plant and equipment.

**Wells**

Well-Unit Water Supply at Aurora, Ill. (75824). Ills. 1700 w. Eng News—Dec. 14, 1916. Details of electric unit pumps.

Large Water-Supply Well Sunk by Open Caisson Method (80943). C. B. Coe. Ills. 1200 w. Eng News-Rec—Sept. 6, 1917. Open excavation inside five successive concrete rings for paper mill well 45 ft. deep and 25 ft. diameter.

**Wilmington, Del.**

Recent Improvements in Wilmington's Water Supply (80997). Edgar M. Hoopes, Jr. Ills. 4000 w. Mun Jl—Sept. 6, 1917. Rapid filtration plant, with turbine-driven centrifugal pumps, etc.

**Wood Stave Pipe**

Modern Practice in Wood Stave Pipe Design and Suggestions for Standard Specifications (80669 D). Ills. 29 pp. A S C E, Pro—Aug., 1917. Discussion on paper of J. F. Partridge, Jr.

Creosoted Wood Stave Pipe and Its Effect Upon Water for Domestic and Irrigation Uses (81258 N). Ills. 17 pp. Univ Wash—Bul. No. 1. Summary of tests by the University of Washington Bureau of Industrial Research.

Modern Practice in Wood Stave Pipe Design and Suggestions for Standard Specifications (81469 D). Ills. 4500 w. A S C E, Pro—Sept., 1917. Continued discussion of paper by J. F. Partridge, Jr.

Modern Practice in Wood Stave Pipe Design and Suggestions for Standard Specifications (81995 D). 2000 w. A S C E, Pro—Oct., 1917. Continued discussion of J. F. Partridge's paper. Modifications suggested.

Pipe Staves Creosoted Without Loss of Strength (81709). O. P. M. Goss. 1800 w. Eng News-Rec—Oct. 4, 1917. Douglas fir treated at low temperature and given crushing tests. Satisfactory results secured.

## WATERWAYS AND HARBORS

**Baltimore**

Two Novel Coal Piers Recently Opened at Port of Baltimore (80584). Ills. 2500 w. Eng News-Rec—Aug. 16, 1917. Pennsylvania plant at Canton, and B. & O. plant at Curtis Bay.

**Bank Protection**

Results of Experiments Looking to the Development of a Form of Subaqueous Concrete Revetment for the Protection of River Banks Against Scour or Erosion (74630 B). E. M. Markham. Ills. 13 pp. Prof. Mem—Nov.-Dec., 1916.

New Type of Mattress Used for River-Bank Protection (75032). A. C. Everham. Ills. 1300 w. Eng News—Nov. 30, 1916. Stone held in place by two layers of wire mesh.

Types of Bank Protection on the Sacramento River Compared (76340). Nathan A. Bowers. Ills. 3500 w. Eng Rec—Jan. 27, 1917. Various revetment methods.

**Barge Canal**

The New York State Barge Canal (78075 N). W. C. Babbitt. Ills. 10 pp. Mich Tech—March, 1917. Canal system, dimensions, locks, dams, harbors, etc. Present state of completion.

New York State and Her Barge Canal (79345 B). Laurance H. Hart, with discussion. Ills. 20 pp. Cleve Eng Soc, Jl —May, 1917. History and description.

What Are the Prospects of Navigation on the New York Barge Canal? (80676). Frank C. Wight. Ills. 4000 w. Eng News-Rec—Aug. 23, 1917. Present condition of the canal and lack of boats.

**Breakwaters**

Breakwater and Jetty Construction in the New London, Conn., District (76294 C). G. E. Verrill. Ills. & 2 Plates. 22 pp. Prof Mem—Jan.-Feb., 1917. Conditions in Long Island Sound. Types and details of important constructions.

**Bulkheads**

Steel Sheetpile Bulkhead Driving Affords New Experience to Designer (76571). Herbert D. Mendenhall. Ills. 3000 w. Eng News—Feb. 8, 1917. Unexpected difficulties at Jacksonville, Fla.

**Canals**

Canali di Navigazione Interna (74852 B). M. Beretta. Ills. 2400 w. Mon Tec—Sept. 20, 1916. Serial, 1st part. Transverse sections, resistance, systems of propulsion, etc.

De opening van het Trollhättankanaal (74861 B). H. A. Van Ijsselsteyn. Ills. 2100 w. Ingr—Oct. 21, 1916. Swedish waterway recently opened.

Unusual Slide of Canal Lining and Its Repair (75035). Ills. 2400 w. Eng News—Nov. 30, 1916. How lining of canal of Turners Falls Power and Electric Co. was repaired.

Form Travelers Hoist Canal-Wall Concrete (76129). E. P. Abbott. Ills. 3000 w. Eng Rec—Jan. 20, 1917. Details of work on Chicago's Calumet-Sag channel.

Ship Canal from Swedish Lake to Ocean (76818). Ills. 900 w. Eng News —Feb. 22, 1917. A 52-mi. canal just opened from Lake Vener to Port of Gothenburg.

The Proposed Rhone-Rhine Canal (76552 A). Map. 2000 w. Engr—Jan. 19, 1917. Route and outline of the project.

Le Nouveau Canal De Trollhättan A Göteborg (77557 B). Ills. 3500 w. Gen Civ—Feb. 17, 1917. New canal from Trollhättan to Göteborg, Sweden. Map, profile, locks, etc.

The British Canal System (77576). 2000 w. Times Eng Supp—Feb. 23. 1917. History, development and engineering features of a system of waterways but little known in the U. S.

Le Canal Wilhelmine Et Ses Écluses (77604 C + D). A. Goupil. Ills. 900 w. Pont Chaus Ann—Sept-Oct., 1916. Design and construction of locks on important canal in Holland.

Sluicing Silt to Reduce Canal Leakage (78745). Fred J. Barnes. Ills. 2000 w. Eng News-Rec—May 17, 1917. Experience gained from experimental plant. Valuable results.

Canal Development (78870). 1100 w. Times Eng Supp—Apr. 27, 1917. Discussion of recent suggestions of Royal Commission on Canals. Their economic advantage questioned.

Forth and Clyde Ship Canal (80394 A). Maps. 1000 w. Engng—July 13, 1917. Past and present schemes for the construction.

Questioni Di Navigazione Interna (80755 A). 2400 w. Mon Tec—July 30, 1917. A plan for connecting the Italian city of Piacenza with Milan and Venice by a system of canals giving communication between existing waterways.

Questions Relatives Aux Canaux De Navigation Intérieure (80722 C + D). 1300 w. Pont Chaus Ann—Mar.-April, 1917. Effect of dimensions of canal sections and design of boats on power.

The Cape Cod Canal (80657 D). William Barclay Parsons. Ills. 143 pp. A S C E, Pro—Aug., 1917. History, location and construction data, with study of hydraulics.

Il Concorso Della Marina (81375 C + D). G. Po. Ills. 10300 w. Riv Marit—June, 1917. Review and progress report on plan for inter-connecting various rivers in northern Italy and giving access to the sea.

Verbetering van den Scheepvaartweg van Amsterdam naar de Lek (82084 B). P. H. Kemper. Ills. 2100 w. Ingr—Sept. 1, 1917. Report of Committee on improvement of the ship canal from Amsterdam to the river Lek, Holland.

**Canal Systems**

I Projetti Per Una Via D'Acqua Fra il Mar Ligure ed il Piemonte (80016 B). Map. 2700 w. Mon Tec—June 10, 1917. Project for connecting waterway between the Italian province of Piedmont and the Mediterranean.

La Camera di Commercio di Mantova (82006 B). 2000 w. Mon Tec—Aug. 10, 1917. Plan of an extensive system of internal waterways for Italy, comprising canal connections between lakes and rivers.

**Coal Dock**

New Lackawanna Coal Dock at Buffalo (76483). Ills. 2200 w. Ry Age Gaz—Feb. 2, 1917. Intensive use of limited ground area.

**Cofferdams**

Cofferdams for Barge Canal Structures at Troy, N. Y. (75268). Ills. 2000 w. Contg—Dec., 1916. Built on rock and gravel bottom exposed to floods.

Box Cofferdams on the Ouachita and Big Sunflower Rivers (76291 C). T. C. Thomas. Ills. & 2 Plates. 20 pp. Prof Mem—Jan.-Feb., 1917. Their construction, conditions, limitations, etc.

**Columbia River**

Improvement of the Mouth of the Columbia River (74629 B). Gerald Bagnall. Ills. & plates. 33 pp. Prof Mem—Nov.-Dec., 1916. History of the various projects and study of the effect of entrance jetties at different stages.

**Concrete**

Concrete Lock Paving Done First in Rapid Construction of Ohio River Dam 35 (79225). George W. McAlpin. Ills. 2500 w. Eng News-Rec—June 14, 1917. Track ties, laid afloat, land in place as coffer is pumped.

**Constantza**

Constantza—Son Port, Son Commerce Et Son Rôle (81398 B). D. Bellet. 5900 w. Rev Tri Can—Aug., 1917. Importance of this great Roumanian port on the Black Sea.

**Cribwork**

A Useful Type of Cribwork (74927). A. E. Eastman. Ills. 1000 w. Can Engr—Nov. 23, 1916. Type used in Welland Canal and Ontario-St. Lawrence Canal work.

**Docks**

Bethlehem Ore Dock in New York Harbor (75282 A). Ills. 1100 w. Iron Age—Dec. 14, 1916. Features of the Hulett and Mead-Morrison unloaders.

Plans, Specifications and Unit Prices for the Dock Under Construction at North Market Street (75460 A). C. E. Smith. Ills. 29 pp. E Cb St L, Jl—Nov.-Dec., 1916.

Constructing and Reconstructing Timber Docks and Bulkhead (75992). Ills. 1500 w. Contg—Jan., 1917. Provisions for heavy lateral pressure.

A Study of the Design of Docks and Wharves (81001). W. H. Hoyt. 3500 w. Ry Age Gaz—Sept. 7, 1917. Abstracted from Bul. Am. Ry Eng. Assn. Considerations of location and construction.

Design of Docks and Wharves (81254 C). W. H. Hoyt. 25 pp. Am Ry Eng Assn, Bul—July, 1917. Prepared for the committee on modern bridges and trestles.

**Drainage**

Large Levee and Drainage System in Indiana (75922). Ills. 1800 w. Eng News—Jan. 11, 1917. Construction methods and outlet design.

**Dredges**

The Three 15-Cubic Yard Dipper-Dredges, Gamboa, Paraiso, and Cascades, as Supplied and Used on the Panama Canal (80654 D). Ray W. Berdeau, Jr. Ills. 13 pp. A S C E, Pro—Aug., 1917. Results of a study of the design, operation and efficiency.

The Three 15-Cubic Yard Dipper-Dredges, Gamboa, Paraiso, and Cascades, as Supplied and Used on the Panama Canal (81996 D). 1500 w. A S C E, Pro—Oct., 1917. Discussion of Ray W. Berdeau's paper.

**Dredging**

Electric Power to Dredge a Relocated River Channel (74534). J. H. Walter. Ills. 1800 w. Eng Rec—Nov. 11, 1916. Dredge operated by 800-h.p. motor.

**Dry Docks**

Dry Dock Characteristics and Design (78242). S. M. Henry. 4000 w. Eng & Can—April 25, 1917. Special reference to the proposed dry dock No. 4, Norfolk, Va.

New Dry Dock at Manchester (79317 A). Ills. 600 w. Engr—June 1, 1917. Brief description of dry dock on Manchester Ship Canal.

History of the Boston Dry Dock (81229 B). James W. Rollins, with discussion. 28 pp. Bos Soc C E, Jl—Sept., 1917. Reports in detail of the cofferdam failure.

**Egypt**

I. Harbor and Coast-Defence Works at Alexandria, Egypt. David Ernest Lloyd-Davies. II. Galvan Port, Bahia Blanca, Argentina. Charles Alfred Trery, with abstract of discussion on both papers

(81195 N). Ills. 55 pp. Instn C E, Nos. 4033 & 4113—Nov. 30, 1015. Description.

**Embankment**

Restauration De La Dique De Charmes (77554 B). A. Dumas. Ills., 3500 w. Gen Civ—Feb. 3, 1917. Repairing break in a reservoir for supplying the Marne-Saône canal.

**English Ports**

South Coast Ports (81414). 3000 w. Times Eng Supp—Aug. 31, 1917. New projects for improvement of Portsmouth, Plymouth, Falmouth and other places.

**Erosions**

River Erosions and Their Prevention (81167 N). S. J. Pollitzer. Ills. 2000 w. Comwh Engr—Aug. 1, 1917. Elementary information for improving the few Australian rivers.

**Flood Control**

Detention Reservoirs with Spillway Outlets as an Agency in Flood Control (81463 D). H. M. Chittenden. 20 pp. A S C E, Pro—Sept., 1917. Inquiry as to how far the detention principle may be made to harmonize the conflicting conditions between flood control and storage.

**Flood Prevention**

The Battle Over the Miami Flood Prevention Plans (74516). H. M. Chittenden. Map. 5400 w. Eng News—Nov. 9, 1916. Summary of evidence thus far presented for and against the project.

Discussion on Floods and Flood Prevention (76297 D). 7 pp. A S C E, Pro—Jan., 1917. Continued discussion of Progress Report of Special Committee.

Special Features of the Miami Conservancy Contracts (81905). Ills. 2200 w. Eng News-Rec—Oct. 18, 1917. Flood prevention work which will cost $10,000,000.

**Flood Protection**

The Miami Valley Flood-Protection Work (75704). Ills. 6000 w. Eng News—Jan. 4, 1917. Serial, 1st part. First of a series of articles on extensive works.

**Floods**

De aan de spoorwegen berokkende overlast tengevolge van de door den stormvloed van 13 Januari, 1916 (74909 B). H. P. M. Geesteranus and others. Ills. 8500 w. Extensive damage to railways caused by storm in Holland.

Investigation of Flood Flow on the Wisconsin River at Merrill, Wisconsin, July 23-24, 1912 (76024 B). Clinton B. Stewart, with discussion. Ills. 29 pp. West Soc Engrs, Jl—Nov., 1916. Investigation made in connection with a lawsuit.

La Protection De Paris Contre Les Inondations (76248 B). A. Dumas. Ills. 5200 w. Gen Civ—Jan. 6, 1917. Methods proposed for protecting Paris from the Seine floods.

Flood Control in the Miami Valley (76791 B). Arthur E. Morgan. Ills. 18 pp. Bos Soc C E, Jl—Feb., 1917. Investigations, problems encountered, and plan adopted.

The Protection of Paris Against Floods (80118 A). Ills. 2500 w. Engr—July 6, 1917. From *Le Génie Civil.* Precautions recommended.

**France**

French Inland Waterways (79980 A). 2200 w. Engng—June 29, 1917. Unfavorable to the extension of the canal system.

**Free Ports**

Ports Francs Et Zones Franches (76259 B). A. Pawlowski. Ills. 2700 w. La Nat—Jan. 13, 1917. Consideration of French ports and zones to be free of customs duties.

Les Ports Française et la Guerre (74911 B). A. Pawlowski. Ills. 3200 w. Gen Civ—Nov. 11, 1916. Waterfront improvements, shipbuilding facilities and trade statistics of some important French ports.

**French Ports**

Les Ports Français Et La Guerre (78279 B). A. Pawlowski. Ills. 6000 w. Gen Civ—Mar. 24, 1917. Dieppe and Trèport; their shipping facilities, commerce, etc.

Les Ports Français Et La Guerre (77556 B). A. Pawlowski. Ills. 11000 w. Gen Civ—Feb. 10, 1917. Arrangement of docks, shipping facilities and equipment and commerce of Rouen and Havre.

Les Ports Français Et La Guerre (78859 B). A. Pawlowski. Ills. 6600 w. Gen Civ—Apr. 28, 1917. Port of Caen; its commerce, furnaces and harbor.

Les Ports Français Et La Guerre (79428 B). A. Pawlowski. Ills. 3600 w. Gen Civ—June 2, 1917. Description of harbor and dock facilities of Honfleur and Saint-Malo .

Les Ports Français Et La Guerre (80709 B). A. Pawlowski. Ills. 4000 w. Gen Civ—July 14, 1917. The ports of Cherbourg and Brest. Harbors, equipment and docking facilities, commerce, warehouses, etc.

Bordeaux Et Ses Ports Annexes Girondins (80752 B). A. Pawlowski. Ills. 7200 w. Gen Civ—Aug. 11, 1917. Bordeaux and its adjacent ports, Blaye and Pauillac. Docks, equipment, harbor facilities and commerce.

Les Ports Français Et La Guerre (82019 B). A. Pawlowski. Ills. 4300 w. Gen Civ—Sept. 22, 1917. Description Fécamp, Trouville, Granville, Rochefort and others. Harbors, docks, equipment, etc. One of a series of many papers on this topic by the same author.

**Great Lakes**

Commerce on the Lakes (81391). Harvey D. Goulder. 2400 w. Naut Gaz—Sept. 20, 1917. History of the growth of traffic on the Great Lakes and development of ports.

**Halifax**

Halifax Ocean Terminals (77956 N). A. C. Brown. Ills. & Maps. 26 pp. Can Soc C E—April 5, 1917. Description of harbor, and terminal facilities and equipment.

**Harbors**

Quebec Harbor Improvements (74713). C. V. Johnson. Ills. 1000 w. Can Engr—Nov. 16, 1916. Freight sheds and conveyor galleries now under construction.

Vancouver Harbor and Its Improvements (74714). C. E. Cartwright. 2000 w. Can Engr—Nov. 16, 1916. Reasons for development; functions of harbor.

Biennial Report of the Board of State Harbor Commissioners for the Fiscals Year Commencing July 1, 1914, and Ending June 30, 1916 (77668 N). J. J. Dwyer, T. S. Williams, and John H. McCallum. Ills. 105 pp. Calif State Print Office—1916.

Harbor Improvements at Valparaiso (79590 A). Ills. 500 w. Engr—June 8, 1917. Further details of the monoliths for the breakwater.

Progress in Toronto Harbor Development (80582). Ills. 3500 w. Can Engr—Aug. 16, 1917. Review of work accomplished and outline of future plans.

**Hydraulic Phenomena**

Hydraulic Phenomena and the Effect of Spreading of Flood Water in the San Bernardino Basin, Southern California (81465 D). A. L. Sonderegger. Plates. 24 pp. A S C E, Pro—Sept., 1917. Analysis showing beneficial effects of spreading.

**Inspection**

Inspection Methods on Government River and Harbor Work (75469). G. S. Verrill. From a paper read before the Conn. Soc. of C. E. Ills. 2500 w. Eng & Con—Dec. 20, 1916. Requirements.

**Italy**

The Proposed Venice-Milan Canal (82026). 1000 w. Naut Gaz—Oct. 18, 1917. Extracts by the U. S. Consul-General at Genoa from the *Vita Marittima e Commerciale* describing the scope and size of the project. Part of the new Italian plan for internal waterways.

**Jetties**

Columbia River Jetty Rapidly Nearing Completion (77716). W. P. Hardesty. Ills. 1800 w. Eng Rec—March 31, 1917. Cost over $14,000,000.

**Lake Ports**

Taking Cross-Sections, Humboldt Jetties, California (81369 C). George F. Whittemore. 2000 w. Prof Mem—Sept.-Oct., 1917. Method used in reconstruction work.

Lake Port Improvements Many and Varied (79231). 2200 w. Eng News-Rec—June 14, 1917. Canvass of work underway or contemplated.

**Lakes**

Philippine Lakes (77969 N). Wallace E. Pratt. Plate. 4000 w. Phil Jl Sci—Sept., 1916. Information as to the 40 or more lakes known.

**Landing Floats**

Method of Constructing Concrete Landing Floats at U. S. Naval Stations, Newport, R. I. (78243). Ills. 1000 w. Eng & Con—April 25, 1917. From article by Kirby Smith describing floats and methods of construction.

**Levees**

Concrete Paving for Small Levee on the Wabash River (75707). George C. Graeter. Ills. 1400 w. Eng News—Jan. 4, 1917. Costs and methods of placing 3-in. concrete facing on earth levee.

The Methods of Levee Location (77491 C). W. E. Knobloch. Ills. 13 pp. Prof Mem—March-April, 1917. Conditions to be determined, cost, material, etc. Comments by W. G. Caples, and by C. McD. Townsend.

River Levees and Flood Control (79074 N). George Higgins. Abstract of paper on "The Goulburn Levees" read before the Victorian Inst. of Surveyors. 2000 w. Comwh Engr—May, 1917. Policy which should be followed in connection with the protection of lands in this valley.

**Lock Gates**

Large Modern Lock Gates (74613 B). Malcolm Elliott, with discussion. Ills. & plates. 37 pp. West Soc Engrs, Jl—Oct., 1916. Describes and compares three lock gates.

The Distribution of Stresses in Mitering Lock-Gates, with Special Reference to the Gates on the Panama Canal (80655 D). Henry Goldmark. Ills. 34 pp. A S C E, Pro—Aug., 1917. Study of the laws governing the distribution of stresses under service conditions. Method of computation outlined.

**Locks**

Filling and Emptying the Third Lock at St. Mary's Falls Canal, Michigan (77489 C). L. C. Sabin. Map and Ills. 20 pp. Prof Mem—March-April, 1917. Details and report of tests.

**London**

Port of London (77580). 1000 w. Times Eng Supp—Feb. 23, 1917. New works proposed at Tilbury, Shadwell, Millwall and India Docks to increase shipping facilities.

**Marseilles**

Les Ports Français Et La Guerre (76233 B). A. Pawlowski. Ills. 10000 w. Gen Civ—Dec. 16, 1916. History of the development of Marseilles, its commerce, and recent improvements in docks and water-front.

**Mechanical Digger**

Sand and Gravel Digger Designed and Built for Ohio River (81079). A. W. Kreamer. Ills. 2200 w. Eng News-Rec—Sept. 13, 1917. Machine to raise concrete aggregate from stream bed.

**Mediterranean Ports**

Les Ports Français Et La Guerre (76237 B). A. Pawlowski. Ills. 4100 w. Gen Civ—Dec. 23, 1916. Port-Saint-Louis, Toulon and Nice harbor facilities and equipment.

Les Ports Français Et La Guerre (76242 B). A. Pawlowski. Ills. 6000 w. Gen Civ—Dec. 30, 1916. Docks and harbors at Cette and Port-Vendres. Commerce, loading facilities and other particulars.

**Mississippi**

Five Days on the Mississippi (75323). Frank C. Wight. Ills. 4800 w. Eng News—Dec. 14, 1916. Describes new methods used in machine-building levees and protecting banks.

The Improvement of the Mouth of the Mississippi River (75408 A). E. H. Schulz, with discussion. Map. 6000 w. La Eng Soc, Pro—Dec., 1916. Account of the work and difficulties.

The Passes of the Mississippi River (77490 C). Edward H. Schulz. Maps and Ills. 35 pp. Prof Mem—March-April, 1917. General description, with history of improvements and present projects.

**Mobile**

Port Development at Mobile (81392). 1000 w. Naut Gaz—Sept. 20, 1917. New projects planned and already under way for developing the waterfront.

**Nantes**

Les Ports Français et la Guerre (74901 B). A. Pawlowski. Ills. 3900 w. Gen Civ—Nov. 4, 1916. Improvements at this French sea port at the mouth of the Loire.

**Nile Floods**

Investigation of the Nile River Flood-Record for Traces of Periodicity (81206 N). Thomas William Keele. Ills. 8 pp. Instn C E—No. 4159. Study of rainfall to determine the periodicity, applying to Australia and other regions in various parts of the world.

**1916**

Harbors, Docks, and Waterways in 1916 (76146 A). 4000 w. Engr—Jan. 5, 1917. Serial, 1st part. Progress.

**Norway**

Le Grand Lac Vener Accessible A La Navigation Maritime (78301 B). C. Rabot. Ills. 1100 w. La Nat—April 7, 1917. New canal connecting Lakes Vetter and Vener with the sea.

**Ore Dock**

A Large New Ore Dock for Lake Superior (76826). Ills. 2200 w. Ry Age Gaz—Feb. 23, 1917. Concrete and steel structure at Two Harbors, Minn.

**Panama Canal**

The Terminal Facilities of the Panama Canal (75380 B). H. H. Rousseau. Ills. 9000 w. U S Nav Inst, Pro—Nov.-Dec., 1916. General description of the works.

General Goethals on the Panama Canal Slide Critics. Also, Panama Canal Annual Report. And, Corrosion of Submerged Metal at Panama Locks (74817). 6500 w. Eng News—Nov. 23, 1916. Abstracts of annual report.

Who Built Panama Canal If Not Its Civilian Force? (74554 A). C. O. Simmons. 2500 w. E Cb Phila, Pro—Nov., 1916. Engineers and men responsible for work.

Gatun Lake (77505 A). H. L. Critchlow. Ills and Map. 16 pp. Corn C E—Feb., 1917. Details of construction of the largest artificial reservoir of the world, to supply water for the canal.

**Paris**

Le Port De Paris Et Son Commerce (77607 B). E. A. Martel. Ills. 3000 w. La Nat—March 3, 1917. Paris as a port. Navigation on the Seine. Commerce under war conditions.

**Philadelphia**

The Department of Wharves, Docks and Ferries, of the City of Philadelphia (76565 A). Ills. 2500 w. E Cb Phila, Pro—Feb., 1917. Work in progress and proposed.

Developing Philadelphia Harbor (80208 A). Ills. 2000 w. Mar Rev—Aug., 1917. Survey of the port facilities. New projects.

**Piers**

Permanent Superstructures on Harbor Piers, Milwaukee, Wis., District (76289 C). J. A. B. Tompkins. Ills. 17 pp. Prof Mem—Jan.-Feb., 1917. Methods adopted.

Deep Water Pier at Halifax (76752). Ills. 2000 w. Contg—Feb., 1917. Concrete pile substructure for large pier with concrete deck and house.

Port of Astoria Steamship Terminal (76525 A). J. P. Newell. Ills. 800 w.

Int Mar Eng—Feb., 1917. New system of municipal docks with coaling facilities, grain elevator and freight piers.

See same heading under *Construction.*

**Plymouth, Eng.**

Plymouth as a Commercial Port (81857 A). 2000 w. Engr—Sept. 14, 1917. Reviews what has been done and the plans for extending dock facilities.

**Port Facilities**

Port Terminal Facilities (82045). Robert Bridges. 2500 w. Naut Gaz—Oct. 25, 1917. How improved facilities for shippers assist industrial development and commerce.

**Port Terminal**

Constructing Port Newark Terminal, New Jersey (74693). Ills. 2000 w. Contg—Nov., 1916. Hydraulic dredging of ship channel, reclaiming marsh, and other improvements.

**Pumping**

Portishead Dock Pumping Machinery (76706 A). Ills. & Plate. 800 w. Engr—Jan. 26, 1917. A pumping plant of interest at Bristol, Eng.

**Revetments**

Using Wire Mesh in Mattress Revetment (76829). Ills. 1500 w. Ry Age Gaz—Feb. 23, 1917. New method of bank protection.

**Rhone**

La Via D'Acqua fra il Rodano e il Reno (81425 C). Ills. 3600 w. Ingeg Ferro—July 31, 1917. Serial, 1st part. Project for a waterway to connect the Rhone and the Rhine.

**River Currents**

Some Uses to Which a River Current May Be Put (75913). Halbert P. Gillette. Ills. 2000 w. Eng & Con—Jan. 10, 1917. Suggestions of uses to which the power of river and tidal currents may be applied.

**River Front**

River Front Improved Without Cost to Taxpayers (79139). Ills. 1100 w. Eng News-Rec—June 7, 1917. Leasing of filled land at Davenport, Ia., pays interest on bonds and forms fund for retiring them.

**River Improvement**

Improvement of Livingstone Channel, Detroit River, Dry Excavation (74634 A). C. Y. Dixon. Map. 2500 w. Prof Mem—Nov.-Dec., 1916. Details of work and plant and equipment used.

Removing Subaqueous Rock Under Difficult Conditions (76845 A). Ills. 2200 w. Engr—Feb. 2, 1917. Deepening the East River at New York.

Improvement of Mississippi River from Winona to La Cross (78794 C). W. A. Thompson and H. M. Anderly. Ills. 8 pp. Prof Mem—May-June, 1917. Improvement in accordance with the 6-ft. channel project adopted by Congress.

Improving the Ohio River Below Pittsburgh, Pa. (78791 C). J. C. Oakes. Ills. 22 pp. Prof Mem—May-June, 1917.

Extracts from "Des Travaux du Fleuve du Rhin" (81368 C). A. J. Ch. Defontaine. Ills. 27 pp. Prof Mem—Sept.-Oct., 1917. Efforts of the French to improve the Rhine along the Alsatian frontier. From a book written about 1838.

**River Regulation**

Ottawa and St. Lawrence River Regulations (77636). C. R. Coutlee. 1500 w. Can Engr—March 22, 1917. Power possibilities are considered.

St. Maurice River-Control Works Are Nearing Completion (81981). Ills. 3000 w. Eng News-Rec—Oct. 25, 1917. A 70,000-yard dam will create the largest reservoir in North America.

**River Traffic**

Barges to Revive River Traffic (80846 A). Ills. 1500 w. Mar Rev—Sept., 1917. Plan to build fifty 1500-ton barges for service on the Mississippi.

**St. Louis**

A Municipal River Terminal System for St. Louis (75459 A). S. W. Bowen. Drawings & Maps. 75 pp. E Cb St L, Jl—Dec., 1916. Results of an investigation of the cost and advisability, with conclusions.

**Sand and Silt**

L'Exploitation Des Zones De Sédimentation (76257 B). J. Dufrénoy. Ills. 4200 w. Rev Gen Sci—Dec. 30, 1916. Commercial uses of sand, silt, animal wastes, etc., deposited near shore and at the mouths of rivers. How such deposits are formed.

**Sanitation**

Proposed Code for the Sanitary Control of Waterways (74508). 800 w. Eng News—Nov. 9, 1916. Par of report of Committee, submitted to Sanitary Section of Am. Pub. Health Assn.

**Sea Defences**

Sea Defences at Hastings (81172 A). G. F. Miller. Extract from paper before Instn. of Mun. & Co. Engrs. 2800 w. Surv'r—Aug. 31, 1917. Improvements.

**Shore Protection**

Data and Designs for a System of Shore-Protection for the Coast Line of Harrison County, Mississippi (75407 A). Hobart D. Shaw. Ills. 3500 w. La Eng Soc, Pro—Dec., 1916. Resumé of investigations and designs that may be adopted.

The Preservation of Sandy Beaches in the Vicinity of New York City (76068 D). 5000 w. A S C E, Pro—Dec., 1916. Continued discussion of Elliott J. Dent's paper.

Lake Shore Protection at Chicago Being Built of Concrete (79226). M. D. Blumberg. Ills. 1800 w. Eng News-Rec—June 14, 1917. Beach paving and bulkheads along Lincoln Park are now of concrete.

**Singapore**

Singapore Harbor Improvements (82025). 1100 w. Naut Gaz—Oct. 18, 1917. Work recently completed giving more extensive wharfage facilities and greater depth of water. Importance of the undertaking.

**Spezia**

Sistemazione Del Porto Della Spezia (74853 B). Ills. 1600 w. Mon Tec—Sept. 20, 1916. Improvements for the benefit of industrial establishments at this Italian sea port.

**Suction Dredge**

See same heading under MARINE AND NAVAL ENGINEERING.

**Tidal Lock**

Tidal Lock With Special Safety Devices for Large Dock at Chemulpo, Korea (75060). Henry Goldmark. Ills. 3000 w. Eng Rec—Dec. 2, 1916. Important improvements in harbor works at this Asiatic port.

**Water Terminals**

Expanding Export Trade Emphasizes Need for Adequate Water Terminals (75774). B. F. Cresson, Jr. 2500 w. Eng Rec—Jan. 6, 1917. Need of factory and warehouse facilities, etc.

**Waterways**

L'Importance Des Ports Sur Les Voies De Navigation Intérieure (78294 B). M. Jacquinot. Ills. 3700 w. Gen Civ—Mar. 31, 1917. Serial, 1st part. Necessity for developing ports on inland waterways.

**Waterway Traffic**

Waterway Transportation for General Electric Company Traffic (78974 A). Robert H. Rogers. Ills. 2500 w. Gen Elec Rev—June, 1917. Possibilities of transportation by the Barge Canal, and matters related. Possibilities of large vessels.

**Weirs**

Methods of Construction of the Sacramento By-Pass Weir (79278 A). J. J. Rosenthal. Ills. 900 w. West Eng—June, 1917. A concrete diversion weir.

**Wharf Equipment**

L'Outillage Des Ports Et Le Chargement Des Navires (78290 B). M. Zack. Ills. 2800 w. Rev Gen Sci—Mar. 30, 1917. Description of wharf cranes in use in various ports of the world.

**Wharves**

Practice and Experience of State Harbor Commissioners, San Francisco, with Concrete Wharf Supports (77705). From paper by Thomas S. Williams, before Am. Assn. of Port Authorities. 1500 w. Eng & Con—March 28, 1917. Methods and experience.

**Yangtse River**

The Upper Yangtse River (76628 A). A. F. Carter. Ills. 40 pp. U S Nav Inst—Feb., 1917. Conditions encountered and methods of handling steam vessels.

## MISCELLANY

**Civil Engineers**

Final Report of the Special Committee to Investigate the Conditions of Employment of, and Compensation of, Civil Engineers (76062 D). 8 pp. A S C E, Pro—Dec., 1916.

**Engineering**

Engineering After the War (74558 A). Frank Bailey. 2000 w. Elec'n—Oct. 27, 1916. Abstract of Presidential address to Assn. of Engrs.-in-Chg.

**Engineers**

Engineers for the Officers' Reserve Corps (74744). A. H. Babcock. 3500 w. Min & Sci Pr—Nov. 18, 1916. How a commission may be obtained.

The Engineer—His Opportunity and His Obligation (79184 A). Lester P. Breckenridge. 12 pp. La Eng Soc, Pro—June, 1917.

Engineers' Part in the War (81020). 1800 w. Eng & Min Jl—Sept. 8, 1917. Views of Capt. Gustave P. Capart, of Gen. Petain's staff, on the importance of all branches of engineering in modern warfare.

**Forts**

The Future of Forts (74980 A). Henri Berthaut. 2500 w. Engr—Nov. 10, 1916. Value of permanent fortifications.

**French Ports**

Comment Développer Nos Ports Maritimes Après La Guerre? (74897 B). P. de Rousiers. 7200 w. Rev Gen Sci—Oct. 30, 1916. Suggestions for development of French sea ports after the war.

**Grain Elevators**

Floating Pneumatic Grain Elevators (77010 A). Plate & Ills. 3000 w. Engng—Feb. 9, 1917. Machinery for discharging grain from vessels.

**Industry**

The Industrial Outlook (80980 A). Charles H. Haddrell. 4500 w. Engr—

Aug. 17, 1917. Critical discussion of the needs of the British manufacturing industry.

**Kirchhoff, Charles**

Biographical Notice of Charles Kirchhoff (74646 D). R. W. Raymond. Photograph. 1500 w. A I M E, Bul—Nov., 1916.

**Landscape Engineering**

Landscape Engineering (76460). George L. Nason. From a paper before the Civ. Eng. Soc. of St. Paul. 3000 w. Eng & Con—Jan. 31, 1917. Some of the problems of the landscape architect.

**Land Slides**

A Phenomenal Land Slide—Supplement (81464 D). D. D. Clarke. Ills. 30 pp. A S C E, Pro—Sept., 1917. Continues the history of the slide at Portland, Ore.

**L'Enfant**

Maj. Charles Pierre L'Enfant (74633 B). William W. Harts. Ills. 2500 w. Prof Mem—Nov.-Dec., 1916. Biographical sketch of the engineer who designed the capital city of the United States.

**Military Engineering**

Accuracy and Probability of Fire (76704 A). George Greenhill. Ills. 1700 w. Engr—Jan. 26, 1917. Serial, 1st part. Theory and practice in shooting.

On the Mexican Border with the 22d Engineers (75929). C. E. Bregenzer. Ills. 3000 w. Eng Rec—Jan. 13, 1917. Serial, 1st part. Drainage problems, bridge building, water supply and other difficulties that were overcome.

Anti-Aircraft Defenses for Coast Fortifications (78061 B). Thomas Q. Ashburn. 7 pp. U S Art, Jl—March-April, 1917. Types, how used, construction and purposes.

A System of Mobile Coast Artillery Defense (78060 B). Ills. 10 pp. U S Art, Jl—March-April, 1917. Advantages.

The Possibilities of Railroad Coast Artillery (78059 B). Meade Wildrick. Ills. 26 pp. U S Art, Jl—March-April, 1917. General discussion of railroad seacoast batteries, with suggestions.

A Visit to the English Front in France (81371 C). D. Victoriano Casajus. Trans. from Spanish. Ills. 20 pp. Prof Mem—Sept.-Oct., 1917. Details of service of communication, aviation, administration, etc.

**National Defense**

Engineers for the Officers' Reserve Corps (75205). A. H. Babcock. 3800 w. West Eng—Dec., 1916. Branches of service that offer fields of usefulness to en-

**Photography**

Camera's Use on Engineering Work Worth Learning (75055). H. Colin Campbell. Ills. 2500 w. Eng Rec—Dec. 2, 1916. Choice of lens important.

**Ports**

The Port of Melbourne (77048 N). A. C. Mackenzie. Ills. 1500 w. Cmwh Engr—Feb., 1917. Details of new railway pier.

**Preparedness**

Preparedness (79081 A). A. M. Lockett. 8000 w. A S M E, Jl—June, 1917. Things engineers can and should do.

**Projectiles**

Projectiles Containing Explosives (78112 A). 6000 w. U S Nav Inst, Pro —April, 1917. Characteristics and effects of explosives used, arrangements, conditions of loading, etc.

**Trade**

Germany's Commercial Campaign in France (81359 A). 3500 w. Engng—Sept. 7, 1917. Germany's methods in gaining a hold on the resources of France.

**War Effects**

Effect of Wars on Trade and National Industry (81448 A). John B. C. Kershaw. 2500 w. Ind Man—Oct., 1917. Reviews relations of trade fluctuations to wars of the last 50 years.

**Weather Bureau**

Suggested Changes and Extension of the United States Weather Bureau Service in California (74788 D). 2000 w. A S C E, Pro—Nov., 1916. Continued discussion of paper by George S. Brinckley and Charles H. Lee.

Suggested Changes and Extension of the United States Weather Bureau Service in California (77326 D). 2500 w. A S C E, Pro—Feb., 1917. Continued ley and Charles H. Lee.

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**Antennas**

A Few Experiments with Ground Antennas (74686 B). Leonard F. Fuller. Ills. 700 w. Inst Rad Engrs, Pro—Oct., 1916. Polar energy distribution curves of various types of low antennas are given and studied.

Notes on Radiation from Horizontal Antennas (74685 B). Charles A. Culver. 1200 w. Inst Rad Engrs, Pro—Oct., 1916. Experiments in radiation from various types.

**Audion**

Theoretical Discussion of the Audion (75416 A). Marius Latour. 2000 w. Elec'n—Dec. 1, 1916.

**Batteries**

Common Battery vs. Local Battery (81105). L. W. Carroll. Ills. 2500 w. Telephony—Sept. 15, 1917. Comparison of systems from cost, service, and company's standpoints.

**Cables**

Losses in Cables Armored with Steel Tape (74699). W. I. Middleton and E. W. Davis. 2500 w. Elec Wld—Nov. 18, 1916. Results of experiments to determine losses when carrying different values of current.

Tests to Determine Heating of Underground Cables (74529). Henry A. Cozzens, Jr. 1500 w. Elec Wld—Nov. 11, 1916. Methods and results.

Installation of a 18,000-Foot Submarine Power Transmission Cable (75361 A). S. J. Lisburger. (Abstract.) 2500 w. Contr—Dec. 15, 1916. Two cables laid across Golden Gate, California, in twelve days.

Installation of a 13000-Foot Submarine Power Transmission Cable (75667). S. J. Lisburger. Abstract from *Pacific Service Mag.* 2500 w. Can Engr—Dec. 28, 1916. Methods used at San Francisco.

Ocean Cables (78076 N). Thomas J. MacKavanagh. Ills. 3000 w. Mich Tech—March, 1917. General information concerning the laying and maintenance, cost, operation, etc.

Multiplexing in Cable Telegraphy (78784 B). George O. Squier. 800 w. Fkn Inst, Jl—May, 1917. Proposes the using of two separate cables one for sending and the other for receiving.

Problems of Operation and Maintenance of Underground Cables (78788 D). John L Harper. 2000 w. A I E E, Pro—May, 1917. Causes of failures are analyzed and preventives suggested.

Protection of Lead-Covered Cables from Electrolysis Caused by Stray Electric Currents (78810 B). R. A. Paine, Jr. Ills. 1800 w. Mun Engrs, Jl—May, 1917. Conditions that cause electrolytic action, systems of protection, and conclusions.

Some Causes of Underground Cable Failure (78735). Henry A. Cozzens, Jr. Ills. 2200 w. Elec Wld—May 19, 1917. Where to look for troubles and the remedies.

The Mechanical Working of Lead Covered Underground Telephone Cables (81199 N). Charles Frederick Street. (Abridged). 2000 w. Instn C E—No. 4155. Experimental tests.

A Capacity Test for Localizing a High Resistance Break in Short Lengths of Submarine Cable (81347 A). H. V. Higgitt. Ills. 600 w. Elec'n—Sept. 7, 1917. Describes a discharge test taken with a ballistic suspension.

**Cable Telegraphy**

On an Unbroken Alternating Current

for Cable Telegraphy (74469 A). Louis Cohen. 500 w. Elec'n—Oct. 20, 1916. Refers to Col. G. O. Squier's paper before the Physical Society of London, and gives data on the electrical constants of receiving apparatus.

**Coherer**

The Development of the Coherer and Some Theories of Coherer Action (78493 A). E. C. Green. Ills. 3000 w. Gen Elec Rev—May, 1917. Serial, 1st part. Early and recent observations of coherer action; a new type of coherer; theories.

**Colonial Telegraphs**

Colonial Telegraphs and Telephones (75626 N). R. W. Weightman. Ills. 31 pp. Instn E E, Jl—Dec., 1916. Interesting features of practice in the Dominions and Colonies.

**Condenser Charging**

On the Use of Constant Potential Generators for Charging Radio Telegraphic Condensers and the New Radio Telegraphic Installations of the Postal and Telegraph Department of France (79379 D). Leon Bouthillon. Ills. 34 pp. Inst Rad Engrs, Pro—June, 1917. Charging of condensers by high voltage direct current generators is discussed theoretically and practically.

**Coupled Circuits**

The Coupled Circuit by the Method of Generalized Angular Velocities (81927 D). V. Bush. 19 pp. Inst Rad Engrs, Pro—Oct., 1917. Rules for determining the complete expression for the oscillating current in any oscillating-current network.

**Detector Circuits**

Quantitative Relations in Detector Circuits (76605 D). Benjamin Liebowitz. Diagrams. 2000 w. Inst Rad Engrs, Pro—Feb., 1917. A discussion of Mr. Armstrong's paper on "A Study of Heterodyne Amplification by the Electron Relay."

**Exchange**

New Exchange at Dixon, Illinois (80689). Ills. 1800 w. Telephony—Aug. 25, 1917. History and description.

**Inductive Interference**

Laws of Industrial Interference (79772). Arthur H. Ford. Ills. 2000 w. Telephony—July 7, 1917. Fundamentals of inductive interference of power lines with telephone lines.

Perturbations Dues Au Courant De Traction (76917 B). Ills. 2700 w. Ind Elec—Jan. 25, 1917. Inductive disturbances in telegraph and telephone lines from nearby electric railway circuits.

The Legal Phases of Interference (76883). H. L. Beyer. 4500 w. Telephony—Feb. 24, 1917. Serial, 1st part. Legal aspects of transmission lines.

Inductive Interference of Power Lines with Telephone Lines (79183). Arthur H. Ford. 2500 w. Wis Engr—May, 1917. Fundamental laws of induction explained and this application to this subject shown by examples.

Interference from Induction (81776). E. W. Kellogg. Ills. 2500 w. Telephony—Oct. 13, 1917. Serial, 1st part. General principles of circuit balance. Reducing disturbing influences, etc.

**Long Distance**

Long Distance Communication (74893). 1200 w. Times Eng Supp—Oct. 27, 1916. Abstract of lecture by Prof. Fleming.

**Mexico**

The Telephone in Mexico (76948). T. G. Nee. 3000 w. Wis Engr—Feb., 1917. Present conditions and possibilities.

**1916**

Electric Transmission of Intelligence in 1916-1917 (76126). John L. Hogan, Jr. Ills. 1500 w. Elec Wld—Jan. 20, 1917. Developments in telegraphy, telephony, and radio engineering.

**Operation**

Semi-Automatic Operation, Landskrona, Sweden (81648 A. J. Hedley. 10 pp. Tel Engr—Oct., 1917. Description.

**Party Lines**

Installation in Tunis (79786 A). M. Barbarat, in *Ann. des Telegraphes et Telephones*. Ills. 3000 w. Tel Engr—July, 1917. Details of interesting installation.

**Police Signals**

Police Signal System for Large Cities (77040). George A. Broder. Ills. 4000 w. Elec Rv & Wes Elec—March 3, 1917. Details of the Gamewell police patrol signaling system.

**Poulsen Arc**

On the Poulsen Arc and Its Theory (80538 D). P. O. Pedersen, with bibliography and discussion. Ills. 64 pp. Inst Rad Engrs, Pro—Aug., 1917. Experimental investigation, and results.

**Radio Communication**

Aero Radio Telegraphy (75185). Allen Henry Wright. Ills. 1000 w. A A Wkly—Dec. 11, 1916. Results of experiments at North Island aviation school.

Lo Sviluppo Della Radiotelegrafia E Della Radiotelefonia (75551 B). C. Solari. Ills. 5400 w. Serial, 1st part. Mon Tec—Oct. 20, 1916. Recent progress and apparatus used.

On a Determination of the Energy Losses in a Radio Telegraph Transmitter (75426 D). Bowden Washington and P. H. Royster. Ills. 2500 w. Inst Rad Engrs, Pro—Dec., 1916. Method devised to measure the total losses.

Some Types of Sustained-Wave Generators Used in Radio Telegraphy (75424

A). William C. Ballard. Ills. 1200 w. Sib Jl Eng—Dec., 1916. Serial, 1st part. Explains apparatus in which high frequency power is generated by the action of moving and stationary conductors, in this paper.

The Heaviside Layer (75427 D). E. W. Marchant, with short discussion. 2700 w. Inst Rad Engrs, Pro—Dec., 1916. Variations in signal strength ascribed partly to "Heaviside cloud." Bibliography.

**Radio Signals**

Quantitative Measurements at Washington on the Signals from the German Radio Stations at Nauen and Eilvese (74675 B). L. W. Austin. Ills. 1500 w. Fkn Inst, Jl—Nov., 1916. Results of observations.

**Radio Telegraphy**

Arlington Radio Station and its Activities in the General Scheme of Naval Radio Communication (74684 B). William H. G. Bullard. Ills. 26 pp. Inst Rad Engrs, Pro—Oct., 1916. Detailed description.

Physical Aspects of Radio Telegraphy (74683 B). John L. Hogan, Jr. Ills. 22 pp. Inst Rad Engrs, Pro—Oct., 1916. Development, scope outlines, operation, etc.

Sustained Wave Transmission Chart (76604 D). Tyng M. Libby. Chart. 1000 w. Inst Rad Engrs, Pro—Feb., 1917. The Sommerfeld, Austin, Fuller and Eccles transmission formulas are compared with available data.

The Application of Radio-Telegraphic Methods of Receiving for Cable Telegraphy (77911 A). Louis W. Austin and Louis Cohen. Ills. 1200 w. Elec'n—March 16, 1917. General sketch of work in progress.

Thermionic Detectors in Wireless Telegraphy and Telephony (78190 A). Diagrams. 2500 w. Nature—April 5, 1917. Types of detectors in use. The construction and operation of the thermionic detector.

United States Radio Development (79378 D). Robert H. Marriott. 18 pp. Inst Rad Engrs, Pro—June, 1917. Delivered before joint meeting at the Panama-Pacific Convention, Sept. 17, 1915. Based on government records and the writer's notes.

Measurements of Radio Antenna on Shipboard and Some Interesting Comparisons (79572 A). F. A. Hart. 800 w. Elec'n—June 8, 1917. Data of interest to marine engineers and advanced experimenters, especially in the case of aerials erected on roofs.

Précautions A Prendre Pendant Le Fonctionment Des Installations Radiotélégraphiques (80009 B). 4400 w. Ind Elec—June 10, 1917. Precautions to be observed in order to avoid danger to operators from accidental shocks. Insulation of apparatus, etc.

The Measurement of Radiotelegraphic Signals with the Oscillating Audion (80537 D). Louis W. Austin, with discussion. 15 pp. Inst Rad Engrs, Pro—Aug., 1917. Details of measurements and necessary precautions.

Allacciamenti Radiotelegrafici A Grande Distanza (80700C + D). G. Montefiñale. 10000 w. Riv Marit—May, 1917. Review of long distance radio communication in various parts of the world. Recent developments.

Radio for Aircraft (80953 A). William Dubilier. Ills. 5500 w. Flying—Sept., 1917. Describes apparatus used and methods adopted.

On the Wave-Lengths and Radiation of Loaded Antennae (81346 A). Balth. Van der Pol. 2000 w. Elec'n—Sept. 7, 1917. Mathematical treatment.

Les Perfectionnements Récents De La Télégraphie San Fil (81399 B). H. Volta. Ills. 2700 w. La Nat—Sept. 1, 1917. Application of improved oscillators and detectors.

Engineering Precautions in Radio Installations (76603 D). Robert H. Marriott. 14 pp. Inst Rad Engrs, Pro—Feb., 1917. Possible dangers and how to avoid.

**Rates**

Piece Rates on Line Construction (75934). M. T. Caster. 2500 w. Telephony—Jan. 13, 1917. Plan used by Lincoln Telephone & Telegraphy Co.

**Relays**

A Study of Heterodyne Amplification by the Electron Relay (78309 D). Edwin H. Armstrong, with discussion. 23 pp. Inst Rad Engrs, Pro—April, 1917. Results of a recent experimental investigation.

**Rural Lines**

Long Life Rural Construction (79249). Harry N. Faris. 2500 w. Telephony—June 16, 1917. Presented at Kansas convention. Means of increasing the life of rural lines.

**San Francisco**

Pioneering on the Pacific Coast (79110 A). J. W. Gilkyson. 4000 w. Tel Engr—June, 1917. Development of the telephone industry in San Francisco from the earliest installations.

**Skin Effect**

Skin-Effect-Resistance Measurements of Conductors at Radio-Frequencies Up to 100,000 Cycles Per Second (75428 D). A. E. Kennelly and H. A. Affel, with discussion. Ills. 58 pp. Inst Rad Engrs, Pro—Dec., 1916. Research work to obtain experimental data on a. c. resistance of various conductors.

**Soldering**

Practical Kinks in Soldering (79389). Ills. 1600 w. Telephony—June 23, 1917. Soldering experiences of telephone repairmen. How soldering is done under difficult conditions.

**Spark Transmitters**

The Effect of Commercial Conditions on Spark Transmitter Construction (81924 D). Julian Barth, with discussion. Ills. 19 pp. Inst Rad Engrs, Pro—Oct., 1917. Six types of commercial sets described.

**Strays**

On the Nature and Elimination of Strays (78307 D). Cornelis J. De Groot, with discussion. Ills. 58 pp. Inst Rad Engrs, Pro—April, 1917. Radio vs. submarine cable telegraphy. Investigation under auspices of Dutch East Indian Dept. of Telegraphs.

**Telautograph**

The Telautograph as Used in Railway Service (78689 A). Carlos de Zafra. Ills. 15 pp. Ry Cb Pitts, Pro—March 23, 1917. Telautograph systems installed and their working, with short discussion.

**Telegraphone**

The Telegraphone (75847 A). Ills. 1500 w. Machy—Jan., 1917. Principle, applications, and method of operating.

**Telegraphy**

Duplexing in the Squier System of Telegraphy (74753 A). Louis Cohen. 2500 w. Elec'n—Nov. 10, 1916. Discusses two new methods.

**Telephone**

Théorie Du Téléphone (80713 B). H. Tournayre. 3700 w. Ind Elec—July 25, 1917. Serial, 1st part. Discussion of the theory of the telephone, with vectorial and analytical treatment of the relations of voltage, current, etc.

Uncle Sam's Use of Telephone (80590). Waldron Fawcett. Ills. 3000 w. Telephony—Aug. 18, 1917. Uses of the telephone in war. Problems of construction.

**Telephone Dispatching**

Operating Railway Selectors Without Batteries (77819 A). J. G. Wray. Ills. 2500 w. Tel Engr—April, 1917. Explains methods of applying current.

**Telephone Exchange**

The Grant Telephone Exchange, Pittsburgh (74267). F. K. Singer. Ills. 6800 w. Elec Jl—Nov., 1916. Typical installation of modern type.

**Telephone Instruments**

The Manufacture of Telephone Instruments (80061). George A. Scoville. 3500 w. Telephony—July 21, 1917. Difficult problems, and factors entering into the making.

**Telephone Protection**

Telephone Protective Apparatus (81486). Jay G. Mitchell. 2500 w. Telephony—Sept. 29, 1917. Principles underlying design of telephone protective equipment.

**Telephone Rates**

See INDUSTRIAL MANAGEMENT, *Finance and Costs.*

**Telephone Service**

Costs of Telephone Service (75737). George C. Matthews. Read before Ind. Tel. Assn. 4000 w. Telephony—Jan. 6, 1917. Elements of cost, rate of return.

Providing for Telephone Service Requirements in Design of Large Buildings (78833). Ills. 1500 w. Eng & Con—May 23, 1917. Features of comprehensive wiring for different classes of buildings.

**Telephony**

The Acoustics of the Telephone (74438 A). Ray H. Manson. 3500 w. Tel Engr Nov., 1916. Production of sound explained and its transmission over ordinary circuits.

The Protection of Telephone Circuits Used in Electric Power Distribution (75097 A). E. K. Shelton. Ills. 5000 w. Gen Elec Rev—Dec., 1916. Disturbances and requirements for protection.

Telefonisch verkeer in Indië (76245 B). A. S. J. Van Kesteren. Ills. 1300 w. Ingr—Dec. 30, 1916. Telephone systems of the Dutch East Indies.

The Automatic Telephone (76911 A). E. L. Grauel. Ills. 1800 w. Engr Soc Penn, Jl—Oct., 1916. Development.

The Telephone Transformer (75933 A). H. S. Sheppard. Ills. 2500 w. Tel Engr—Jan., 1917. Applications.

The Year in the Telephone Field (75670). Stanley R. Edwards. 3500 w. Telephony—Dec. 30, 1916. Annual review.

Co-operation and the Telephone (77074 A). N. C. Kingsbury. 7500 w. Tel Engr —March, 1917. Address before the Central States Conference at Evansville, Ind.

Indianapolis Is Now Automatic (77640). John Grant. Map. 6500 w. Telephony—March 24, 1917. Details of Automatic telephone system and innovations introduced.

A Successful Pennsylvania System (77867). L. M. Peterson. Ills. 2000 w. Telephony—April 7, 1917. Progress of Consolidated Telephone Co. of Hazleton, Pa.

Telephone Transmission (78011 A). Brancroft Gherardi. 2500 w. Sib Jl Eng —April, 1917. Problems in connection with long distance transmission.

Telephone Equipment Protection (78164). A. A. Ladon. Ills. 2500 w. Telephony—April 21, 1917. Read before Wis. State Tel. Assn. Lightning arresters, fuses, sneak-current arresters.

Machine-Switching Telephone Gear (77950 N). F. R. McBerty. Ills. 29 pp. Instn E E—April, 1917. Problems of machine-switching, describing equipment and maintenance.

Successful Management Principles (77997). 3500 w. Telephony—April 14, 1917. Telephone organization in communities of from 1500 to 80,000 inhabitants.

Telephone Transmission (78459 A). Charles Allen Wright. Ills. 3000 w. Tel Engr—May, 1917. Shows interesting aspects.

Loaded Telephone Circuits (79109 A). W. N. Furthman. Ills. 4000 w. Tel Engr—June, 1917. Serial, 1st part. Characteristics, testing and design of loading coils and field testing sets for the use of linemen and inspectors.

Some Modern Problems of Telephone Engineers (79798 A). Stanley R. Edwards. Ills. 2000 w. Sib Jl Eng—July, 1917. Unanswered questions relative to exchange equipment.

Construction Material and Pole Line Hardware (81030 A). 11 pp. Tel Engr—Sept., 1917. Standardization Committee report of the Kansas Independent Telephone Assn.

The Creation of the Telephone (81296). C. E. Scribner. Ills. 2500 w. Telephony—Sept. 22, 1917. History of the invention and early development.

Telephonic Transmission Losses of Abridged Impedances, Series Resistances and Capacitances (81647 A). K. Ogawa and T. Arakawa. 9 pp. Tel Engr—Oct., 1917. Serial, 1st part. Report No. 19 of the second Series of Electro-Technical Laboratory, Tokyo, Japan.

**Transmitters**

Additional Experiments with Impulse Excitation (78308 D). Ellery W. Stone, with bibliography. Ills. 10 pp. Inst Rad Engrs, Pro—April, 1917. Experiments with excitation transmitter.

A New Transmitter Developed (80873). Ills. 1500 w. Telephony—Sept. 1, 1917. Details of agitation type of transmitter and what it will do.

Articulation in Transmission (81680). Ray H. Manson. 1500 w. Telephony—Oct. 6, 1917. Tests to show defective articulation in a particular transmitter.

An Automatic Transmitter for Distress Signals (81925 D). Chester M. Agner. Ills. 800 w. Inst Rad Engrs, Pro—Oct., 1917. A rotating disc is arranged to carry curved blocks on its periphery. Each block permits transmitting a certain sign.

Underground Telephone Cables (81957 A). Georges Viard. Abstract from *Ann. des Postes*. 2500 w. Elec'n—Oct. 5, 1917. Conditions affecting the use of interurban underground cables and results obtained.

**Transpositions**

The Transposed Telephone Pair (80872). Jesse M. Grigg. Ills. 1800 w. Telephony—Sept. 1, 1917. Theory of disturbing potentials and explanation of transpositions.

**War Telephones**

Meeting the Nation's War Telephone Needs (80921). Ills. 1800 w. Elec Wld—Sept. 1, 1917. Resources placed at disposal of government.

**Wave Detectors**

Wave Detectors for Wireless (80035). Ills. 2500 w. Times Eng Supp—June 29, 1917. Oscillation valve, work of Edison, De Forest, Fleming and others.

**Wayleaves**

Discussion on "Wayleaves" (80094 N). 16 pp. Instn E E, Jl—June, 1917. Discussion of C. Vernier's paper.

**Wireless Apparatus**

On the Calculation of the Coupling Coefficient of Two Coaxial Flat Spiral Coils (81837 A). P. Baillie. 500 w. Elec'n—Sept. 21, 1917. Serial, 1st part. A quick method of calculating the coefficient of two such coils.

**Wireless Stations**

Some Long-Distance Wireless Stations (77909 A). Ills. 1500 w. Elec Rev—March 16, 1917. From the *Wireless World*. Views and particulars of stations which have helped to make history.

**Wireless Telephony**

The Wireless Telephone of the Future (74437 A). Henry N. Hall. Ills. 3300 w. Tel Engr—Nov., 1916. A study of chief engineer John J. Carty. in the *N. Y. World*.

Wireless Development in Railway Work (74439 A). 5000 w. Tel Engr—Nov., 1916. Report of Committee No. 9. Assn. of Ry. Telegraph Supts. with discussion.

# ELECTRO-CHEMISTRY

**Accumulators**

How An Accumulator Is Made (75413 A). Ills. 1800 w. Autocar—Dec. 2, 1916. Outline of processes involved.

Care of Storage Batteries (76748). J. C. Hawkins. 2200 w. Prac Eng, Chi—Feb. 15, 1917. Required attention, troubles, causes, and remedies.

The Current Efficiency in Charging the Edison Storage Battery (77670 N). M. DeKay Thompson and L. R. Byrne. 1500 w. Am El-Chem Soc- May, 1917. Investigation to study the current efficiency on the separate plates.

Automobile Storage Batteries (78406 N). W. C. Brooks. Ills. 24 pp. Am El-Chem Soc—May, 1917. Reviews the chemistry of the lead accumulator and describes improvements.

Effect of Temperature Upon the Performance of the Edison Storage Battery (78771 N). 1500 w. Am El-Chem Soc—May, 1917. Discussion of L. C. Turnock's paper.

The Prospects of the Accumulator (80377 A). Ludwig Strasser. 1500 w. Elec'n—July 20, 1917. Abstract from *Elek Zeit.* Address before Elektrotechnische Verein.

Notes on the Electric Storage Battery (81047 A). Edward Wanton Smith. Ills. Presented before Phila. Soc. of Am Chem. Soc. 16 pp. E Cb Phil, Pro—Sept., 1917. General conditions, chemical action.

Effect of Lithium Upon the Capacity of the Edison Storage Battery (81988 N). L. C. Turnock. 1500 w. Am Elec-Chem Soc—Oct., 1917. Comparative tests show increased capacity up to 12 per cent.

**America**

The Future Opportunities for American Electrochemistry (75751). E. F. Roeber. Ills. 1500 w. Elec World—Jan. 6, 1917. Conditions brought about by the war have given unusual opportunities.

**Analysis**

Electrolytic Analysis with Small Platinum Electrodes (78741 B). F. A. Gooch and Matsusuke Kobayashi. Ills. 1500 w. Am Jl Sci—May, 1917. Experimental investigations.

A Method for the Commercial Analysis of Ferro-Silicon (81729 N). Russell E. Lowe. 1500 w. Am El-Chem Soc—Oct., 1917. Procedure described.

**Antimony**

Electro-Deposition of Antimony from Fluoride Baths Containing Addition Agents (77460 N). F. C. Mathers, K. S. Means and B. F. Richard. Ills. 2500 w. Am El-Chem Soc—May, 1917. Studied from fluoride baths of free hydro-fluoric acid with additions of various agents.

**Batteries**

Innovazioni Nelle Pile Elettriche (75554 B). 2100 w. Ind—Nov. 19, 1916. Abstract from Elektrochem Zeit, of article on recent primary cells.

Storage Batteries (75299 F). F. A. Daubin. Ills. 4500 w. Am Soc Nav Engrs, Jl—Nov., 1916. Description, operation and general characteristics of the lead-acid type.

Tests of Antimony Plating Baths (77461 N). F. C. Mathers and K. S. Means. 500 w. Am El-Chem Soc—May, 1917. Tests from numerous electrolytes tried, with conclusions.

Pile A Densité Et A Faible Usure Locale (78880 D). Ch. Féry. Ills. 3100 w. Soc Int Elec—Mar., 1917. A zinc-carbon cell with slow polarizing characteristic for general purposes.

A Cuprous Oxide Photo-Chemical Cell (78405 N). Theodore W. Case. 13 pp. Am El-Chem Soc—May, 1917. Method and apparatus for the search of new reactions.

Characteristics of Small Dry Cells (78769 N). 1800 w. Am El-Chem Soc—May, 1917. Discussion of C. F. Burgess' paper.

**Battery Charging**

Charging Storage Batteries in Telephone Central Stations (79011). Q. A. Brackett. Ills. 1500 w. Elec Jl—June, 1917. Present practice and the advantages of rectifiers.

Charging Storage Batteries of Electric Vehicles (80232 A). J. J. Kline. Ills. 5500 w. Gen Elec Rev—Aug., 1917. Construction of the storage cell and its actions on charge and discharge; discussion of the constant potential system of charging, etc.

**Brass**

Brass Solutions With 100 Per Cent Anode Efficiency (75418). E. S. Thompson. 2000 w. Brs Wld—Dec., 1916. Theory of the problem and results of experience.

**Catalysis**

Theory of Contact Catalysis (81733 N). Wilder D. Bancroft. 15 pp. Am El-Chem Soc—Oct., 1917. Reviews facts and theories of catalytic action, discussing from the standpoint of absorption upon the catalyst or the controlling factor.

The Poisoning of Catalytic Agents (81723 N). Wilder D. Bancroft. 25 pp. Am El-Chem Soc—Oct., 1917. Considers catalytic processes in which poisoning of the catalyzer takes place.

**Chemical Terms**

Suggested Reforms in Some Chemical Terms (81731 N). Carl Hering. 13 pp. Am El-Chem Soc—Oct., 1917. Suggestions for modifying definitions and scope.

**Chemistry**

Chemistry and American Industry (78783 B). Allerton S. Cushman. 18 pp. Fkn Inst Jl—May, 1917. Shows the usefulness and many needs of chemistry in industrial development.

**Combustion**

Fractional Combustion (81734 N). Wilder D. Bancroft. 10 pp. Am El-Chem Soc—Oct., 1917. Discusses the general question of which of two combustible gases will burn more rapidly when mixed.

**Copper Sulphate**

L' Electrolyse Des Solutions De Sulfate De Cuivre (77598 B). Ills. 3000 w. Ind Elec—Feb. 25, 1917. Serial, 1st part. Results when using carbon anodes. Relation of voltage, current, weight of metal deposited, etc., from copper sulphate solutions.

**Corrosion**

Corrosion Develops at Panama Lock Gates and Valves (75058). 1800 w. Eng Rec—Dec. 2, 1916. General Goethal's annual report describes damage and methods of repair.

Corrosion of Ingot Iron Containing Cobalt, Nickel, or Copper (76539 B). Herbert T. Kalmus and K. B. Blake. Paper before Am. Inst. of Chem. Engrs. Ills. 5500 w. Jl Ind & Eng Chem—Feb., 1917. Investigations and conclusions.

Corrosion (78744 A). D. M. Buck. Ills. 1500 w. Af Eng Soc of Minn, Bul —May, 1917. With special reference to corrugated, galvanized culverts.

Observations Upon the Atmospheric Corrosion of Commercial Sheet Iron (78772 N). 3500 w. Am El-Chem Soc—May, 1917. Discussion of paper of E. A. and L. T. Richardson.

Structure of the Coating on Tinned Sheet Copper in Relation to a Specific Case of Corrosion (78523). Paul D. Merica. Ills. 15 pp. U S Bur Stds, Tech paper No. 90—April 21, 1917. A study and conclusions.

The Corrosion of Cast Iron and Its Bearing Upon the Electrolytic Theory of Corrosion (78399 N). E. A. Richardson and L. T. Richardson. Ills. 1000 w. Am El-Chem Soc—May, 1917. Results of test.

**Electric Furnaces**

Carbon-Tube Furnace for Testing Refractories (75981 A). Ills. 1200 w. Engng—Dec. 29, 1916. Details of a new electric furnace described by Mr. Ezer Griffiths in a paper before the Faraday Society.

Electric Furnaces Commercially Classified (77781). W. E. Moore. 3000 w. Elec Jl—April, 1917· Arc, resistance and induction furnaces and their uses.

Electric Furnace Practice in the Manufacture of Steel Casings (77779). T. S. Quinn. Ills. 1200 w. Elec Jl—April, 1917. Data on furnace installed by the Lebanon Steel Co.

Possibilities of the Electric Furnace (77725). Thomas R. Hay. Ills. 2500 w. Elec Rv & Wes Elec—March 31, 1917. Serial, 1st part. Deals with the electric furnace from the central station standpoint.

The Electric Furnace as a Central Station Load (77777)· Thomas Robson Hay. Ills. 550 w. Elec Jl—April, 1917. Shows why it is a desirable load, and gives points for making furnace installations.

The Field of the Electric Furnace (77783). C. B. Gibson. Ills. 4000 w. Elec Jl—April, 1917. Types and their applications.

The Regulation for Electric Furnaces (77778). Brent Wiley. Ills. 900 w. Elec Jl—April, 1917. The Thury regulator and its applications.

Electric Furnace Steel (77780). W. H. Cogswell. Ills. 1500 w. Elec Jl—April, 1917. Process, cost, and characteristics.

Leads for Electric Furnaces (79240 A). Arvid Lindström. Ills. 3000 w. Met & Chem Eng—June 15, 1917. Translated from *Teknisk Tidskrift*. Discusses resistance, self-inductance, and proper arrangement of large conductors.

Electric Furnace as a Copper-Melting Medium (79659). Charles Vickers. Ills. 3500 w. Fndry—July, 1917. Advantages of the granular-resistance type of electric furnace.

Granular Carbon Electric Furnace (79644 A). Samuel A. Tucker. Ills. 700 w. Met & Chem Eng—July 1, 1917. An inexpensive laboratory furnace for general purposes.

A Study of Electric-Furnace Operation (80322). F. T. Snyder. Ills. 4000 w. Elec Rev & Wes Elec—Aug. 4, 1917. Relation of the costs of electrodes, refractories, electricity, labor, and raw materials to total expense.

Electric Furnace Making Big Headway in the Steel Industry (80323). Ills. 5000 w. Elec Rev & Wes Elec—Aug. 4, 1917. Advantages of electric smelting, refining of steel, production of alloy steels and steel castings.

Possibilities of the Electric Steel Furnace (80324). R. L. Montgomery. Ills. 1500 w. Elec Rev & Wes Elec—Aug. 4, 1917. The development.

Heroult Electric Furnaces (81265 N). Walter C. Kennedy. Ills. 1500 w. Assn I S E E—Sept., 1917. Shows a few electrical characteristics of a 15-ton Heroult furnace operating on 60-cycle current.

The Greaves-Etchells Electric Furnace (80876 A). E. Kilburn Scott. Ills. 1800

w. Met & Chem Eng—Sept. 1, 1917. An all-British furnace designed to operate on a 3-phase or 2-phase supply.

A Resistance Furnace (81987 N). Frank Thornton, Jr. Ills. 2500 w. Am Elec Chem Soc—Oct., 1917. Considers heating furnaces by resistors placed inside the furnace, and problems in connection with the application.

Resistance Type Furnace for Melting Brass (81989 N). T. F. Baily. Ills. 1000 w. Am Elec Chem Soc—Oct., 1917. Furnace of non-crucible type. Running tests, and mechanical tests of brass produced.

Solving Electric Furnace Power Problems (81658 A). Edwin L. Crosby. Read before Am. Found. Assn. 2500 w. Fndry—Oct., 1917. (Special No.) Co-operation between central station men and furnace operators necessary to secure economy of power.

The Electric Furnace in the Development of the Norwegian Iron Industry (81985 N). Haakon Styri. 10 pp. Am El-Chem Soc—Oct., 1917. Review, with account of introduction of electric steel furnaces and electric pig iron furnaces.

**Electro-Analysis**

A New Electro-Analysis Apparatus (81721 N). J. L. Jones. Ills. 1000 w. Am El-Chem Soc—Oct., 1917. Describes a six- and a ten-unit electrically-stirred electrolytic apparatus, particularly for use on analysis of non-ferrous alloys.

**Electrochemical Industry**

The Nature of the Power Requirements of the Electrochemical Industry (80245 B). F. A. Lidbury, with discussion. 40 pp. West Soc Engrs, Jl—May, 1917.

**Electrochemical Plant**

The Substation Problem of the Electrochemical Plant (81728 N). J. L. McK. Yardley. Ills. 20 pp. Am El-Chem Soc—Oct., 1917. Outline of factors bearing on the matter, discussing some fundamental particulars.

**Electrodes**

The Production and Properties of Magnetite Electrodes (77669 N). M. DeKay Thompson and T. C. Atchison. 1200 w. Am El-Chem Soc—May, 1917. Work aiming to improve the brittleness.

Les Électrodes Pour Fours Électriques (80751 B). J. Escard. Ills. 6000 w. Gen Civ—Aug. 4, 1917. Serial, 1st part. Manufacture; properties and uses of electrodes for electric furnaces.

Electrodes for Electric Furnaces: Their Manufacture, Properties, and Utilization (81829 A). Ills. 2500 w. Elec Rev—Sept. 14, 1917. Serial, 1st part. Their physical and chemical nature, their position and properties, and the effects produced in each case.

**Electrolysis**

Contributions to the Knowledge of the Electrolysis of Aqueous Solutions of Vanadium Salts (78770 N). 2200 w. Am El-Chem Soc—May, 1917. Discussion of paper of S. Fischer, Jr.

High Temperature Heat Developed During Electrolysis (78768 N). 1500 w. Am El-Chem Soc—May, 1917. Discussion of Carl Hering's paper.

Graphical Presentation of Electrolysis Data (81487). H. A. Cozzens, Jr. Ills. 2000 w. Elec Wld—Sept. 29, 1917. Relative advantages of three schemes of presenting data.

See also same heading under CIVIL ENGINEERING, *Water Supply*.

**Electrolytes**

Electrolytic Dissociation in Non-Aqueous Solutions (75341 B). H. J. M. Creighton. 15 pp. Fkn Inst, Jl—Dec., 1916. Results of experimental study.

**Electrolyzers**

Electrolyzers and Their Management (80428 A). Ernest Reuss. 2000 w. Elec Rev—July 27, 1917. Nature of problems encountered in their use.

**Electrometallurgy**

Some Economic Factors in the Production of Electrolytic Zinc (81217 D). R. G. Hall. 15 pp. A I M E, Bul—Sept., 1917. Governing conditions in this industry, the relation of methods to ore deposits, freight rates, and sources of power.

Electric Pig Iron in War Times (81986 N). Robert Turnbull. 1500 w. Am El-Chem Soc—Oct., 1917. A study, and reasons why it is not being made at present in North America.

Electrolytic Pickling Process and Its Effect on the Physical Properties of Iron and Steel (81726 N). John Coulson. Ills. 1200 w. Am El-Chem Soc—Oct., 1917. Cites an electrolytic process for removing oxides from the surface of iron, steel, and other metals without impairing their physical properties.

Silver Peroxide and the Valence of Silver (81722 N). H. C. P. Weber. Ills. 3500 w. Am El-Chem Soc—Oct., 1917. Discusses the black compound found on the anode during the electrolysis of silver nitrate solution.

The Electric Furnace for Non-Ferrous Metallurgy (82075). Ills. 3500 w. Elec Wld—Oct. 27, 1917. Advantages of electric heat, types of furnaces, and data on performance.

**Electroplating**

Temperature in Electroplating (75420). F. J. Liscomb. 1800 w. Brs Wld—Dec., 1916. The effect of changes of temperature in the plating-room.

An Investigation of the Brittleness Produced in Steel Springs by Electroplating (75956 A). M. DeKay Thompson and C. N. Richardson. 1200 w. Met & Chem Eng—Jan. 15, 1917. Experimental study to determine the cause, with results.

The Mechanical Engineer in the Electro-Plating Industry (76184). Joseph W. Wunsch. 3000 w. Brs World—Jan. 1917. Serial 1st part. Processes and their advantages.

Electro Plating Machinery (76809). Ills. 2500 w. Brs Wld—Feb., 1917. Serial, 1st part. The plating barrel.

"Up and Away" Anodes (76810). E. S. Thompson. 2500 w. Brs Wld—Feb., 1917. Discussion of nickel anodes.

Temperature, Ions and Rapid Plating (77431). W. V. Hoyt. 1700 w. Brs Wld—March, 1917. Dismisses the effect of temperature in terms of ions.

Making It Stick (78187). E. S. Thompson. 2000 w. Brs Wld—April, 1917. Causes of peeling.

The Partly Submerged Plating Barrel (78185). Ills. 2000 w. Brs Wld—April, 1917. Serial, 1st part. Construction and operation, with advantages claimed.

Addition Agents in the Electro-deposition of Silver from Uncommon Silver Salts (78402 N). F. C. Mathers and T. G. Blue. 600 w. Am El-Chem Soc—May, 1917. Does not seem to give better deposits than from the nitrate.

Essential Oils as Addition Agents in Plating Baths (78401 N). F. C. Mathers and A. B. Leible. 2500 w. Am El-Chem Soc—May, 1917. Research to determine the absorption of essential oils by metals.

Some Puzzling Equations With Which the Plater Must Contend (78781). E. S. Thompson. 2500 w. Brs Wld—May, 1917. Theories as to what changes take place in plating solutions.

The Evolution of Hydrogen from Cyanide Plating Solutions (78407 N). Oliver P. Watts and Albert Brann. 6 pp. Am El-Chem Soc—May, 1917. Experimental study.

The Protection of Iron by Electroplating (78767 N). 1200 w. Am El-Chem Soc—May, 1917. Discussion of O. P. Watts and P. L. De Verter's paper.

Triton Electroplating Plant at Washington Barracks, D. C. (78793 C). R. W. Crawford. Ills. 14 pp. Prof Mem—May-June, 1917. Details of the plant and its operation.

Increasing the Output of the Plating Room (79658). E. P. Later. 2500 w. Fndry—July, 1917. How the efficiency can be increased.

Intelligent Use of Nickel-Plating Solutions (80269). E. P. Later. 3500 w. Fndry—Aug., 1917. Laboratory tests, and information.

**Japan**

The Japanese Chemical Industry (78426 A). H. Nishida. 2000 w. Met & Chem Eng—May 1, 1917. New enterprises started in Japan since the outbreak of the war.

**Nickel**

The Influence of Superimposed Alternating Current on the Electro-deposition of Nickel (80945 B). S. A. Tucker and H. George Loesch. 2500 w. Jl Ind & Eng Chem—Sept., 1917. Research work and conclusions.

Nickel Plating (81316). F. C. Mathers, E. H. Stuart, and E. G. Sturtevant. 3500 w. Brs Wld—Sept., 1917. Work undertaken to find the nickel plating bath which would give the best deposit at the highest current or voltage.

**Nitrate of Ammonia**

The Manufacture of Nitrate of Ammonia by Electric Power at Coke Oven Plants (80627 A). E. Kilburn Scott, with discussion. Ills. 7300 w. Colly Gdn—Aug. 3, 1917. Ways of making ammonia and nitric acid from the atmosphere. Power from coke ovens; plant required, cost, uses, etc.

**Nitrate Plant**

Advantages of Rock Island for Government Nitrate Plant (77713). H. S. Putnam. 1000 w. Elec Wld—March 31, 1917. Reasons favoring this site.

**Nitrates**

L'Effort Allemand Dans Le Domaine Des Matières Azotées (76912 B). C. Madtignon. 5800 w. Rev Gen Sci—Jan. 15, 1917. What Germany has done to obtain nitrogen compounds.

Nitrates from the Air (76567). W. L. Goodwin. 2000 w. Can Min Jl—Feb. 1, 1917. Extracts from article in *Queen's Qrly*. Nitrogen fertilizers, nitric acid, nitrates and ammonia.

The Organic Nitrogen Compounds of Soils and Fertilizers (76630 B). Elbert C. Lathrop. 37 pp. Fkn Inst, Jl—Feb., 1917. Investigations to determine the chemistry of such nitrogenous soil compounds, their origin and changes, etc.

Manufacture of Synthetic Nitrates by Electric Power (80554 A). E. Kilburn Scott. Abstract. 2000 w. Elec'n—July 27, 1917. Details of furnaces and their operation.

Nitrate Supply Committee Recommendations on Synthetic Nitric Acid For the Government With Reports on Various Methods (80944 B). 15500 w. Jl Ind & Eng Chem—Sept., 1917. Statements and reports relating to the fixation of nitrogen, and procuring necessary nitric acid.

**Nitric Acid**

Direct and Indirect Methods of Making Nitric Acid (74991 A). E. Kilburn Scott.

Ills. 1700 w. Elec'n—Nov. 17, 1916. Abstract of a lecture at University College, London. Details of two methods of making nitric acid from the atmosphere.

**Nitrogen**

Nitrogen and Nitrates from Bituminous Coal (75113 B). C. G. Atwater. 2500 w. Jl Ind & Eng Chem—Dec., 1916. Read before Am. Chem. Soc. Ammonia from coal and its transformation to nitric acid.

Literature of the Nitrogen Industries, 1912-1916 (75908 A). Helen R. Hosmer. 6000 w. Gen Elec Rev—Jan., 1917. General review of the literature published during the last five years.

The Fixation of Nitrogen (77146 B). John E. Bucher. Ills. 20 pp. Jl Ind & Eng Chem—March, 1917. Details of process differing from those now in commercial use in fixing nitrogen in the form of alkali cyanides.

The Fixation of Nitrogen as Cyanide (77350 A). 2500 w. Met & Chem Eng—March 15, 1917. Reviews a lecture by John E. Bucher at College of City of N. Y.

Is the Recovery of the Nitrogen in Sewage Sludge Practicable? (77807 B). William R. Copeland. 2500 w. Jl Ind & Eng Chem—April, 1917. Gives data showing it to be commercially practicable.

Literature of the Nitrogen Industries, 1912-1916 (77814 B). Helen R. Hosmer. 15 pp. Jl Ind & Eng Chem—April, 1917. Statements of paper published during the last five years, with bibliography.

The Organic Nitrogen Compounds of Soils and Fertilizers (78120 B). Elbert C. Lathrop. 32 pp. Kkn Inst, Jl—April, 1917. A study.

Synthetic Nitrogen Compounds (81090 A). 3000 w. Engr—Aug. 24, 1917. Methods used in Germany for the recovery of nitrogen in useful form.

Sources of Supply of Nitrogen Compounds for Explosives and Fertilizers (81940 A). Ralph Earle. 21 pp. U S Nav Inst, Pro—Oct., 1917. Notes on the procuring of nitrogen in chemically-combined or fixed form.

**Nitrogen Fixation**

La Fixation De L'Azote Atmosphérique (79426 B). D. Florentin. 4800 w. Serial, 1st part. Gen Civ—May 19, 1917. Review of methods of atmospheric nitrogen fixation.

**Physical Chemistry**

Oxidation and Reduction in Physical Chemistry—Consistency of Terms and Conceptions (78427 A). Carl Hering. 3000 w. Met & Chem Eng—May 1, 1917. Suggests consistent interpretations of these terms.

Electrical Endosmose and Absorption (78397 N). T. R. Briggs, H. L. Pierson and H. S. Bennett. 10 pp. Am El-Chem Soc—May, 1917. Relations discussed. Experimental study.

**Pickling**

The Electrolytic Pickling of Steel (77459 N). M. DeKay Thompson and O. L. Mohlman. 1000 w. Am El-Chem Soc—May, 1917. Investigates the relative efficiency of the electrolytic and the chemical processes of pickling steel, as regards the amounts of acid, iron and time consumed.

Electrolytic Recovery of Copper and Sulphuric Acid from Copper Mill Pickling Solutions (81727 N). J. L. Jones. Ills. 1200 w. Am El-Chem Soc—Oct., 1917. Precipitation by iron scrap; manufacture of bluestone crystals; electrolytic recovery.

**Power Problems**

Nature of the Power Requirements of the Electrochemical Industry (76672). F. A. Lidbury, before joint meeting in Chicago. 1700 w. Elec Rv & Wes Elec—Feb. 10, 1917. Power consumption and supply.

**Slags**

Characteristics of Electric Furnace Slags (78478). Wallace G. Imhoff. 2000 w. Bt Fc & Stl Pt—May, 1917. The function of the first, or oxidizing slag; the impurities which are removed from the steel by this slag, etc.

**Springs**

The Prevention of Brittleness in Electroplated Steel Springs (81724 N). T. S. Fuller. 1800 w. Am El-Chem Soc—Oct., 1917. Tin-dipping before copper plating is found to prevent embrittlement.

**Tank Resistance**

An Analysis of Tank Resistance in Electrolytic Refining (74593 A). Lawrence Addicks. Ills. 4500 w. Met & Chem Eng—Nov. 15, 1916. Sources of loss due to contact and conductor resistance.

**Tungsten**

Electrolytic Behavior of Tungsten (75787 A). Walter E. Koerner. 6000 w. Inst & Chem Eng—Jan. 1, 1917. Read before Am. Elec. Chem. Soc. Results of experiments.

The Electrolytic Behavior of Tungsten (77672 N). Walter E. Koerner. 6500 w. Am El-Chem Soc—May, 1917. Research work and results.

**Zinc Plating**

Zinc Plating as a Protection Against Corrosion (78055 A). J. W. Wunsch. 1700 w. Machy—June, 1917. General principles, processes of application, and comparative efficiency of galvanizing.

See also Corrosion, under MECHANICAL ENGINEERING, *Materials of Construction.*

## ELECTRO-PHYSICS

**Alloys**

Les Alliages Ferro-Magnetiques (77560 B). J. Vichniak. Ills. 2500 w. Gen Civ—Feb. 24, 1917. Serial, 1st part. Electromagnetic behavior of irons now used for commercial electrical purposes.

**Alternating Currents**

Ueber die Bestimmung der Ortscurven in der graphischen Wechselstromtechnik (75563 B). Otto Bloch. 3600 w. Serial, 1st part. Schweiz Bau—Nov. 18, 1916. Mathematical treatment of alternating current problems.

**Atoms**

Structure of the Atom (77137 A). Dr. Saul Dushman. Ills. 6000 w. Gen Elec Rev—March, 1917. Serial, 1st part. Theories of the structure in the light of recent discoveries in physics.

**Battery Rooms**

Ventilation of Battery Rooms (74750). M. A. Walker. 1700 w. Power—Nov. 21, 1916. Danger of explosions and methods of effectively ventilating.

**Battery Switchboards**

Automatic Storage-Battery Charging Switchboards for Fire-Alarm Systems (74841). George A. Broder. Ills. 1000 w. Elec Rv & West Elec—Nov. 25, 1916. Detailed description.

**Coherer**

See same heading under *Communication.*

**Conductivity**

Chemical Composition vs. Electrical Conductivity (78491 A). Colin G. Fink. 1200 w. Gen Elec Rev—May, 1917. Experimental work and results.

**Conductors**

Mechanical Stresses Between Electrical Conductors in Air and in the Vicinity of Magnetic Material (79790). K. C. Randall. Diagrams. 2500 w. Elec Jl—July, 1917. Discusses the design of structures for conductors, and explains forces.

**Corona**

Corona and Rectification in Hydrogen (76636 D). J. W. Davis and C. S. Breese. Ills. 15 pp. A I E E Pro—Feb., 1917. Results of an investigation.

The Electric Strength of Air—VII (76637 D). J. B. Whitehead and W. S. Brown. Ills. 30 pp. A I E E, Pro—Feb., 1917. Careful determination of corona-forming voltages for alternating and for positive and negative continuous voltages under same conditions.

The Electric Strength of Air and Methods of Measuring High Voltage (78118 B). J. B. Whitehead. Ills. 18 pp. Fkn Inst, Jl—April, 1917. Air as an insulator; the law of corona; the corona voltmeter, etc.

**Detectors**

Some Characteristics of Crystal Detectors (75973 A). 2000 w. Elec—Dec. 29, 1916. Investigates the behavior as used in wireless telegraphy when subjected to varying conditions.

A Study of the Law of Response of the Silicon Detector (76545 A). Louise S. McDowell and Frances G. Wick. Abstract from *Phys. Rev.* 1800 w. Elec'n—Jan. 19, 1917. Study of the device and conditions under which it can best be used; and a study of the law of response.

**Dynamo**

Electric Valve Phenomena in the Dynamo-Electric Machine (80093 N). F. Creedy. 22 pp. Instn E E, Jl—June, 1917. Investigations introductory to a study of the theory of dynamo-electric machines.

**Electric Currents**

The Generation of the Electric Current (77750 A). Ills. 2500 w. Ry & Loco Eng—April, 1917. Explains apparatus and conditions.

**Electrodes**

The Production and Properties of Magnetic Electrodes (78653 A). M. DeKay Thompson and T. C. Atchison. Read at Detroit meeting of Am. Elec-Chem. Soc. 1200 w. Met & Chem Eng—May 15, 1917. Experiments on the addition of copper oxide in the production of magnetite electrodes, showing its beneficial effects.

**Electromagnetism**

La Réciprocité Des Phénomènes Électriques et Magnétiques (75607 D). D. Berthelot. 194 pp. Soc Int Elec—Aug.-Sept.-Oct., 1916. Exhaustive discussion of electricity and magnetism in the light of modern theory.

**Electrons**

The Motion of Ions and Electrons Through Gases (79848 B). E. M. Wellisch. 32 pp. Am Jl Sci—July, 1917. Experimental investigations.

The Case for the Electron (81851 A). 2500 w. Engng—Sept. 14, 1917. The theory that electricity is atomic in structure is shown to be supported by experiment. Editorial.

**Electron Theory**

Le Mouvement Brownien des Particules Électrisées Das Les Gaz (74898 B). A. Schidlof. 5900 w. Rev Gen Sci—Oct. 30, 1916. Discussion of recent theories of the charge of an electron.

**Electrotechnics**

Post-War Electrotechnics (76999 N). C. V. Drysdale. 4000 w. Instn E E, Jl—Feb., 1917. Address to the students' section.

**Flux Density**

Notes on a New Method for the Determination of the Magnetic Flux Density and Permeability (76606 D). August Hund. Diagrams. 24 pp. Inst Rad Engrs, Pro—Feb., 1917. Outlines a new method.

**Fusing**

The Fusing of an Electric Wire (81830 A). 1700 w. Elec Rev—Sept. 14, 1917. Considers fires due to fusing of wires seldom proved and often disproved. Urges efficiency in electrical installations.

**Gases**

The Electrical Properties of Gases (78988 A). Ills. 2200 w. Engng—May 11, 1917. Review of Sir J. J. Thomson's lecture at the Royal Institution.

The Electrical Properties of Gases (79312 A). 3000 w. Engng—May 25, 1917. Editorial review of J. J. Thomson's third lecture on this subject.

The Electrical Properties of Gases (79315 A). Ills. 1800 w. Engng—June 1, 1917. Editorial review of J. J. Thomson's fourth lecture at the Royal Institution.

The Electrical Properties of Gases (79586 A). 3000 w. Engng—June 8, 1917. Editorial review J. J. Thomson's fifth lecture on this subject.

The Electrical Properties of Gases (79733 A). 4000 w. Engng—June 15, 1917. Editorial review of J. J. Thomson's concluding lecture of his course on this subject.

Industrial Applications of Electrons (79729 A). 1500 w. Engng—June 15, 1917. Editorial review of Sir J. J. Thomson's closing lecture before the Royal Institution.

**Insulating Tape**

Insulating Tapes and Their Application (78468). Dean Harvey. Ills. 2500 w. Elec Jl—May, 1917. Materials used, with suggestions.

**Insulation**

Report of the Joint Rubber Insulation Committee—1916 (78154 D). 20 pp. A I E E, Pro—April, 1917. Types of specifications; analytical procedure, etc.

See Rubber Insulation, under MECHANICAL ENGINEERING, *Materials of Construction.*

**Iron Alloys**

The Electrical Resistivities of Iron Alloys (79688 A). T. S. Fuller. 1000 w. Gen Elec Rev—July, 1917. Records results of investigations.

**Light**

The Electromagnetic Theory of Light (76414 A). David Vance Guthrie. 18 pp. Sci Mthly—Feb., 1917. Outlines the development of the theory and its essentials.

**Light Phenomenon**

The "Vosmaer Phenomenon" (77671 N). William C. Moore. 1000 w. Am El-Chem Soc—May, 1917. Theoretical explanation of the various effects of using different electrodes, different pressures and different gases.

**Magnetic Shielding**

The Magnetic Shielding of Large Spaces (81058 N). Ernest Wilson. Ills. 3500 w. Instn E E, Jl—July, 1917. Experimental investigations.

**Magnetism**

Determination of the Degree of Uniformity of Bars for Magnetic Standards (74823). Raymond L. Sanford. Ills. 14 pp. U S Bur Stds, Sci paper 295—Nov 21, 1916. Method of determining the degree of magnetic uniformity of straight bars, etc.

El Paramagnetismo (74869 D). R. Gans. 3900 w. Univ Nac Plata—May, 1916. Susceptibility of paramagnetic substances to magnetic force. Mathematical.

Teoria Estadistica del Magnetismo (74868 D). R. Gans. 4000 w. Univ Nac Plata—May, 1916. Mathematical treatment of the theory of magnetism.

The Characteristics of Iron in High Frequency Magnetic Fields (76197 B). Ralph Bown. Ills. 4500 w. Fkn Inst, Jl—Jan., 1917. Digest of the most important papers on the behavior of ferromagnetic materials in high frequency alternating magnetic fields.

Magnetic Reluctivity (76410 A). Charles P. Steinmetz. 3000 w. Gen Elec Rev—Feb., 1917. Review and discussion under seven headings.

A Test of the Magneton Theory (78062). Earle M. Terry. Ills. 2200 w. Wis Engr—March, 1917. Investigations and results.

**Magnets**

An Apparatus for the Commercial Testing of Permanent Magnets (74990 A). G. B. Betteridge. Ills. 1500 w. Elec'n—Nov. 17, 1916. Gives values of flux and magnetizing force at any moment.

A Mechanical Property of Certain Magnetized Bodies (75070 A). E. F. Northrup. Ills. 900 w. Met & Chem Eng—Dec. 1, 1916. Phenomenon observed and its explanation.

Permanent Magnets (79689 A). F. C. Kelley. 7 pp. Gen Elec Rev—July, 1917. Résumé of the work of the principal investigators.

Design of Solenoids and Plunger Magnets (81919). George L. Hedges. 1500 w. Elec Wld—Oct. 20, 1917. Formulæ for computing diameters of plungers for cheapest, lightest and smallest designs.

**Oscillating Currents**

Oscillating-Current Circuits by the Method of Generalized Angular Velocities (76638 D). V. Bush. 1800 w. A I E E, Pro—Feb., 1917. Method and examples.

**Oscillations**

The Effect of the Spark on the Oscillations of an Electric Circuit (74687 B). John Stone Stone, with discussion. Ills. 26 pp. Inst Rad Engrs, Pro—Oct., 1916. Develops theory which considers circuits containing both conductor and spark resistance.

**Phosphoroscope**

An Improved Form of Phosporoscope (77144 A). W. S. Andrews. Ills. 1000 w. Gen Elec Rev · March, 1917. Designed to determine the fluorescence and phosphorescence of various compounds.

**Power Factor**

See *Generating Stations.*

**Precipitation**

See same heading under *Power Applications.*

**Radiation**

Homogeneity of Visible Radiations (75185 A). 1500 w. Engng—Nov. 17, 1916. Gives results of investigations.

Radiation and the Electron (81228 B). R. A. Millikan. Ills. 5000 w. Fkn Inst, Jl—Sept., 1917. Facts in the field of radiation discovered through study of electrons. Theories examined.

**Radio-Activity**

Radio-Activity and Some Advances in Physical Science (81805 A). Howard H. Barker. 3000 w. Met & Chem Eng—Oct. 15, 1917. Types of radiation; characteristics of the radio elements and other information of interest.

**Radium**

The Application of Radium in Warfare (81725 N). Charles H. Viol and Glenn D. Kammer. 2500 w. Am El-Chem Soc—Oct., 1917. Sources of radium and its extraction; use in therapy; in luminous paint and its various applications.

**Reactance**

The Reactance of Strap Conductors (79634). H. B. Dwight. 1500 w. Elec Rev & Wes Elec—June 30, 1917. Formulæ and curves with typical examples.

**Rectifiers**

The Vibrating Rectifier Defined (74297). J. C. Grindell. Ills. 1200 w. Prac Eng, Chi—Nov. 1, 1916. Explains operating principles and wiring.

**Resistances**

A Universal Resistance Standardizing Bridge (75972 A). C. V. Drysdale. Ills. 2000 w. Elec'n—Dec. 29, 1916. Serial. 1st part. Details of improved bridge and some measurements made with it.

The Grading of Starting Resistances for Series Motors and for Series Parallel Control (75624 A). F. T. Chapman. 2000 w. Elec'n—Dec. 8, 1916. Explains methods of procedure.

**Roentgenology**

Some Modern Developments in Roentgenology (81878 N). L. Erasmus Ellis, with discussion. Ills. 18 pp. So Af Inst Elec Engrs, Trans—June, 1917. Types of apparatus used and their medical and surgical application.

**Roentgen Rays**

Roentgen Rays from Sources Other Than the Focal Spot in Tubes of the Pure Electron Discharge Type (77797 A). W. D. Coolidge and C. N. Moore. Ills. 4500 w. Gen Elec Rev—April, 1917. Tests to determine the source and amount of extraneous radiations and their effects.

**Sheet Steel**

Magnetic Properties of Sheet Steel (77124). T. Spooner. 4500 w. Elec Jl—March, 1917. Considers hysteresis loss, eddy-current loss, permeability and various factors which affect them.

**Split-Phase Magnet**

Theory and Operation of Split-Phase Magnet (74698). Fr. Hymans. Ills. 1600 w. Elec Wld—Nov. 18, 1916. Serial, 1st part. Derivation of victor diagram of split-phase magnet action.

**Thermocouples**

Calorized Iron as an Element for Thermocouples (81720 N). O. L. Kowalke. Ills. 1000 w. Am El-Chem Soc—Oct., 1917. Concludes that heavy wire, lightly calorized, gives as constant results as uncalorized iron, and has a much longer life.

**Wave Forms**

On the Wave-Forms of Magnetizing Current and Flux Density for a "Stalloy" Magnetic Circuit (74300 A). B. Hague and S. Neville. Ills. 3500 w. Elec'n—Oct. 13, 1916. Harmonic analysis of waves.

**X-Rays**

L'Examen Interne des Métaux au Moyen des Rayous X (74920 B). Ills. 1200 w. La Nat—Nov. 11, 1916. Description of radiagraphs of steel by use of Coolidge tubes.

Cristales Y Rayos X (75560 D). C. Meyer. Ills. 13000 w. Soc Cien Arg Ann—May-June, 1916. Study of crystals by means of Roentgen rays.

La Radiographie Rapide (75571 B). E. Coustet. Ills. 1900 w. Rev Gen Sci—Nov. 30, 1916. Improved X-ray tubes for rapid work.

Röntgenstralen (76256 B). H. G. Nolen. Ills. 7200 w. Ingr—Jan. 6, 1917. Brief elementary treatment of general properties of Röntgen radiations.

**Cantonments**

Electricity in the National Army Cantonments (80775). Ills. 3500 w. Elec Rev & Wes Elec—Aug. 25, 1917. Details of installations. Central-station service used exclusively.

**Centralization**

Advantages of Centralization in Energy Supply Demonstrated (77036). Albert H. Bridge. 1500 w. Elec Rv & Wes Elec—March 3, 1917. Experiences in Great Britain show economic benefits.

**Central Stations**

Planning the New Central Station Office Building (74843). Ills. 1000 w. Elec Wld—Nov. 25, 1916. Outlines system used in handling business of Huntington (Ind). Light & Fuel Co.

Developing More Water Power on Genesee at Rochester (74365). Ills. 2400 w. Eng News—Nov. 2, 1916. Under-river tunnel to new 48,000-hp. station.

Advertising Suggestions for Central Stations (75682). J. C. McQuiston. 2000 w. Elec Rev & Wes Elec—Dec. 30, 1916. Essentials in advertising electricity.

Central Station Growth and Rate Reductions (76332). 1500 w. Elec Wld—Jan. 27, 1917. Principles of the method adopted in St. Louis and Milwaukee.

Dubuque Electric Company's Plant (77541). E. M. Walker. Ills. 1000 w. Elec Rv & Wes Elec—March 24, 1917. Remodeled without interruption of service.

Tendencies in Central Station Design (77039). W. R. Thompson. 2000 w. Elec Rv & Wes Elec—March 3, 1917. The more important aspects of design and equipment.

Tendencies in Central Station Practice (77038). J. W. Shuster. 3000 w. Elec Rv & Wes Elec—March 3, 1917. Considerations that govern size and number of units and other features of design for large stations.

Operating Features of 3200-Kilowatt Central Station (78948). Ills. 2200 w. Elec Rev & Wes Elec—May 26, 1917. Station in Aurora, Ill., and its operation.

New Power Station at Albany (79929). Charles H. Bromley. Ills. 2500 w. Power—July 17, 1917. A model small central station of new type.

Central-Station Service (80759 A). Thomas Robson Hay. 6000 w. Ind Man—Sept., 1917. Arguments for, and advantages of that service.

The Central Station Industry in War Time (82076). William H. Onken, Jr. 1500 w. Elec Wld—Oct. 27, 1917. Critical review of conditions. Hopeful outlook for the future.

Commercial Department War-Time Measures (82077). 2500 w. Elec Wld—Oct. 27, 1917. Analysis of labor conditions as they affect central stations, of economies practiced, and problems involved.

**China**

The Electrical Power Industry in China and Indo-China (76894). Ludwig W. Schmidt. 4000 w. Power—Jan. 30, 1917. Detailed information of power plants.

**Coire**

Das Neue Elektrizitätswerk der Stat Chur an der Plessur bei Lüen (80032 B). O. Kuoni. Ills. 1800 w. Schweiz Bau—June 30, 1917. Municipal plant for energy supply to the city of Coire, Switzerland.

**Combined Plants**

Economical Combination of Water Power and Steam Plants and a Convenient Method of Solution (79377 D). H. St. Clair Putnam. Ills. 17 pp. A I E E, Pro—June, 1917. A determination of the economic limits in steam and water power plant developments.

**Compressed Air**

Compressed-Air Uses in Power Stations (79635). Charles A. Hirschberg. Ills. 2500 w. Elec Rev & Wes Elec—June 30, 1917. Advantages for cleaning, repairing, hoisting and conveying, pumping and construction work.

**Connected Stations**

Linking Up Power Stations (75586). 1100 w. Times Eng Supp—Nov. 24, 1916. Various engineering problems involved in interconnection of high-tension circuits.

Linking-Up Electric Power Stations (75118 A). 3000 w. Elec Rev—Nov. 17, 1916. Practice in America and England.

The Parallel Operation of Electric Power Stations (75227 A). John S. Peck. Ills. 5000 w. Instn E E—Nov. 23, 1916. Engineering problems involved and types of apparatus available.

**Cooking**

Die Wirtschaftlichkeit der Kochstromabgabe für die Abrehmer und die Elektriztätswerke (80754 B). W. Wyssling. 12000 w. Schweiz Elek Ver Bul—July, 1917. Advantages of the cooking and heating load to the consumer and to the central station.

**Costs**

Electricity Supply Costs (80551 A). Frank H. Whysall. Ills. 2200 w. Elec'n —July 27, 1917. Abstract. Effect of site, size, etc.

**Denmark**

The Progress of Electricity in Denmark (76359). John J. Dunne. 2200 w. Elec. Rev & Wes Elec—Jan. 27, 1917. Statistics on central station conditions.

**Diversity**

Diversity and Diversity Factors (76515). Terrell Croft. Ills. 3300 w.

Power—Feb. 6, 1917. Elements that determine the diversity factors.

**Electrical Mobilization**

Mobilization Problems of the Central Station Industry (78945). Herbert A. Wagner. 2000 w. Elec Rev & Wes Elec—May 26, 1917. Abstract of N. E. L. A. presidential address.

**Electricity Supply**

Dublin Electricity Supply (74982 A). 3500 w. Engr—Nov. 10, 1916. Reviews report of P. W. d'Alton.

Recent Developments in Electrical Supply (75224 A). A. E. McKenzie. Abstract of chairman's address to the Manchester Local Soc. of I. E. E. 3000 w. Elec'n—Nov. 24, 1916. Organization, linking-up of power stations, supplies for war purposes, etc.

**Electric Power**

Gas Authorities as Suppliers of Electricity (74468 A). J. W. Napier. Slightly abbreviated paper read before N. British Assn. of Gas. Mgrs. 4000 w. Elec'n—Oct. 20, 1916. Details of Alloa Corporation undertaking.

The Progress of Economic Power Generation and Distribution (74310 A). Samuel Insull. Ills. 6000 w. A S M E, Jl—Nov., 1916. Abstract of address at New Haven. Economic problems.

**Electric Service**

The Sale of Electric Service in Larger Quantities (75749). Peter Junkersfeld. Ills. 2500 w. Elec Wld—Jan. 6, 1917. The applications that have caused unprecedented growth in central stations sales.

**Engines**

Steam vs. Oil Engines for Small Light Plant (78637). L. H. Morrison. Diagrams. 1000 w. Power—May 15, 1917. How the type of engine was decided upon when it was necessary to replace an old one with one or two units.

**Equalizers**

Flywheel Load Equalizers (77162 A). Ills. 3500 w. Elec'n—Feb. 16, 1917. Largely used for electric winders and rolling mills. Have been used for coal hoists and ore-handling plants.

**Evansville, Ind.**

Evansville Public Utilities Power Plant (80884). George E. Sloats. Ills. 1200 w. Natl Engr—Sept., 1917. Latest type of switchboard and pump control.

Leading Plants in Evansville (80928). Thomas Wilson. Ills. 3500 w. Power—Sept. 4, 1917. The largest power plants are described.

**Fuel**

Fuel Economy (76841 A). Discussion by Julius Frith and Drummond Paton. 2700 w. Colly Gdn—Feb. 2, 1917. From the electrical engineer's point of view, and from the mining standpoint.

**Fuel Economy**

Fuel Economy (79935 A). J. A. Robertson. 5000 w. Abstract of paper and discussion. Elec'n—June 22, 1917. Considers possibility of economizing by centralizing power production; and by combining coal carbonization with derivation of electricity.

Fuel Economy (80079 A). J. A. Robertson. Abstract of paper read before the Incor. Mun. Elec. Assn. 2000 w. Mech Engr—July 6, 1917. Possible economies in fuel consumption.

Value of Fuel Economy in the Power Plant (80159 A). Reginald Trautschold. 2500 w. Ind Man—Aug., 1917. Economy secured by improved operation, especially in small plants.

Fuel Economy (80045). 2600 w. Times Eng Supp—June 29, 1917. Paper by J. A. Robertson on economy of coal by large central stations read before Incorporated Municipal Elect. Assoc., England.

See also same heading under MINING AND METALLURGY, *Coal and Coke*.

Pulverized Coal as a Power-House Fuel (75744). Reginald Trautschold. Ills. 4500 w. Coal Age—Jan. 6, 1917. Is not considered economically justifiable.

Using Low-Grade Fuels With Existing Equipment (80927). R. J. S. Pigott. Ills. 3000 w. Elec Wld—Sept. 1, 1917. Problems involved in burning high-ash coals and effect on equipment, etc.

**Hydro-Electric**

Le Centrali Idroellettriche per lat Trazione Sul Gottardo (74850 B). 1400 w. Ind—Oct. 15, 1916. Hydro-electric power stations for Swiss Federal railways.

Diversion-Weir Canal Type Used for Pioneer Hydroelectric Development in Sandy Soil (75184). Ills. 1800 w. Eng Rec—Dec. 9, 1916. Work near Boelus, Neb.

High Efficiency in a Hydroelectric Plant Obtained Through Unique Design (75102). J. W. Swaren. Ills. 3000 w. Elec Jl—Dec., 1916. The Cross Cut power plant of the Salt River project, Arizona.

La Centrale Idroelettrica Del Secondo Salto Del Pescara (75552 B). Ills. 1300 w. Ind—Nov. 5, 1916. Generating station at lower falls of Pescara river, Italy.

A New Hydro-Electric Plant of Unusual Design (76042). Everett Cole. Ills. 800 w. Wis Engr—Dec., 1916. Plant at Wissota, Wis.

Per la utilizzazione delle energie idrauliche in Italia (76210 B). A Manfredini. 1800 w. Mon Tec—Nov. 30, 1916. Consideration of best methods of developing hydro-electric powers in Italy.

Fishing Creek Station Develops 44,000 Horsepower Under 50-Foot Head (76656).

Ills. 1500 w. Eng Rec—Feb. 10, 1917. Distinguishing features of plant.

Southern Power Company Adds 40,000-Hp. Capacity to Its System (76744). Ills. 1000 w. Eng News—Feb. 15, 1917. Notes on development and construction.

Hydro-Electric Power Plant of the Cedars Rapids Manufacturing and Power Company (76775). Henry Holgate. 3500 w. Can Engr—Feb. 15, 1917. Conditions, and details of this work.

Hydro-Electric Station in the Möhne Valley, Westphalia (76544 A). E. Treiber. Ills. 1200 w. Elec'n—Jan. 19, 1917. Abstract from *Electro Zeit*. Detailed description.

Construction and Operation of a Connecticut Hydroelectric System (77052). Ills. 2000 w. Elec Wld—March 3, 1917. Serial, 1st part. Features of Falls Village 20000 h.p. station.

Diamond Drilling at Muscle Shoals, Tennessee River (77492 C). W. S. Winn. Ills. 20 pp. Prof. Mem—March-April, 1917. Site and work, with outline of earlier projects.

Los Angeles' Hydro-Electric Power Plant (77035). Ills. 1000 w. Mun Jl—March 1, 1917. First municipal plant for utilizing fall in aqueduct.

The Hydroelectric Development of the Turners Falls Power & Electric Company at Montague City, Mass. (77141 A). B. R. Connell. Map & Ills. 5500 w. Gen Elec Rev—March, 1917. Largest single hydro-electric development of the New England States.

The Hydro-Electric Power Plant of the Cedars Rapids Manufacturing and Power Co., at Cedars, P. Q. (77226). J. C. Smith, Abstract of paper before Can. Soc. Civ. Engrs. Ills. 2000 w. Can Engr—March 8, 1917. Deals particularly with power house and its equipment.

Water Power in Ireland (77582). 1200 w. Times Eng Supp—Feb. 23, 1917. Extent of resources of Ireland and their development in the future.

Highest Head Hydro-Electric Plant in East is Being Built at Silver Lake, Vermont (78340). W. E. Conner. Ills. 1500 w. Eng News-Rec—April 19, 1917. Details of construction.

Largest Hydroelectric Plant in New England (78173). Ills. 3500 w. Elec Wld—April 21, 1917. Features of the Montague City station in the Connecticut River valely.

La Houille Blanche En Russie (78297 B). C. Rabot. Ills. 2300 w. La Nat—Mar. 31, 1917. Power possibilities of streams in Russia and Siberia.

Hydro-Electric Plant for a Yorkshire Mill (78055 A). Ills. 2500 w. Engr—March 23, 1917. Interesting features of a plant in England.

Large Concrete Caissons Sunk from Trestles (78341). C. H. Covey. Ills. 2000 w. Eng News-Rec—April 19, 1917. Work at Grand' Mère, Quebec.

Plant to Serve 546-Mile Transmission Line (78021). Ills. 1500 w. Elec Wld—Aug. 14, 1917. Methods used in building a hydroelectric plant in mountains fifty miles from a railroad.

Low- Head Power Development at Prairie du Sac (78779). H. W. Young. Ills. 3000 w. Elec Rev & Wes Elec—May 19, 1917. Hydroelectric plant of 15,500 kilowatts capacity.

The Wairua Falls Hydro-Electric Power Scheme (78672 A). Ills. 1100 w. Engr—April 27, 1917. Details of a plant in New Zealand.

Interconnected Hydroelectric System (79255). Ills. 2000 w. Elec Rev & Wes Elec—June 16, 1917. Interesting features of the Washington Water Power Co., Spokane, Wash.

The Bombay Hydro-Electric Power Scheme (79026 A). Ills. & Plate. 2200 w. Engr—May 18, 1917. Serial, 1st part. The Tata Power scheme, by which energy is supplied over a distance of 43 miles.

The Seattle Hydroelectric Plant (79211). W. A. Scott. Ills. 1200 w. Elec Rev & Wes Elec—June 9, 1917. Interesting features of plant and details of new construction work.

Why Hydroelectric Development Lags (79362). Hugh L. Cooper. Ills. 2500 w. Elec Wld—June 23, 1917. Its value in conserving labor. Need of fair legislation.

Montana Power Company's System (79909). W. A. Scott. Ills. 3000 w. Elec Rev & Wes Elec—July 14, 1917. Essential features of many interconnected hydroelectric plants.

La Houille Blanche Dans Les Alpes Françaises (80008 B). 3000 w. Ind Elec—June 10, 1917. "White coal" in the French Alps. Hydro-electric installations finished, and projected.

La Rénovation De La France Par La Houille Blanche (80025 B). A. Pawlowski. Ills. 2700 w. La Nat—June 23, 1917. Great increase in development of hydro-electric installations in the southeastern portion of France.

L'Électrification De La Catalogne (80027 B). P. Sallior. Ills. 3300 w. La Nat—June 30, 1917. Hydro-electric plants in various parts of Spain totaling 1,500,000 k. w. Projects under way.

The Tasmanian Great Lake Hydro-Electric Power Scheme (80534 A). Ills. & Plates. 1800 w. Engr—July 27, 1917. Interesting features of this development.

A Flexible Hydro-Electric Plant (81340). Carl V. Johnson. Ills. 1500 w. Power—Sept. 25, 1917. A water turbine designed to obtain maximum power from a variable water-supply.

A Small Hydro-Electric Development on Top of the Andes (81551 A). J. H. Stokes. Ills. 1000 w. Gen Elec Rev—Oct., 1917. Line crosses the continental divide of the Andes at 16,000 ft. Power used mainly for operation of copper smelters.

Extension of St. Lawrence River Power Development Under Way (81869). Ills. 1000 w. Eng News-Rec—Sept. 20, 1917. Substructure at Cedar Rapids extended for eight 10,800 h.p. units.

Le Energie Idroelettriche Italiane e il Risparmio del Carbon Fossile (82046 C). A. Pratesi. 2300 w. Soc Ing Arch Ital—Sept. 16, 1917. Serial, 1st part. Possible development of hydro-electric energy in Italy, and the consequent saving of coal.

Features of Hiram Falls (Me.) Development (81635). Ills. 2200 w. Elec Wld—Oct. 6, 1917. Details of development on Saco River. Special dam and draft-tube construction, etc.

Hydroelectric Plant of the Cerro de Pasco Mining Company in Peru (81509). Ills. 1800 w. Elec Rev & Wes Elec—Sept. 29, 1917. Interesting South American high head power development for mining property.

South Falls and Cobden Hydro-Electric Plants (81761). Ills. 2500 w. Can Engr—Oct. 11, 1917. Typical small plants taken over and improved by the Ontario Power Commission.

L'Industrie Hydro-Electrique Dans Les Alpes Françaises Et Son Avenir (82032 B). J. Révil. 2800 w. Rev Gen Sci—Sept. 15-30, 1917. Hydro-electric develments on the French side of the Alps. Plans for the future.

Surge Tanks (81849 A). Ills. 2500 w. Engng—Sept. 14, 1917. Explains principle of the differential surge tank as applied in the Ontario Power Co.'s plant at Niagara Falls.

The Barcelona Traction, Light and Power Company (81715 A). A. Huguenin. Map & Ills. & Plates. 2500 w. Engng—Sept. 21, 1917. Serial, 1st part.

**Induction-Generator Plant**

Experience with Induction-Generator Plant (78368). J. H. Siegfried. Ills. 2000 w. Elec Wld—April 28, 1917. Pacific Power & Light Co.'s drop plant in the Naches Valley, in operation two years without an attendant.

**Isolated Plants**

A Central Station Viewpoint of an Isolated Power Plant (76395). Julius G. Berger. 2000 w. Power—Jan. 30, 1917. How the central station analyzes the cost of producing power and its argument in favor of purchased power.

Making Current for Making Shoes (80214). Ills. 1800 w. Prac Eng, Chi—Aug. 1, 1917. Leather dust and shavings form part of fuel supply in a Chicago isolated plant.

**Italy**

Derivazione Dall' Aniene (78265 C). G. R. Lorenzini. Ills. 3600 w. Soc Ing Arch Ital—Mar. 1, 1917. 25,000 h.p. hydro-electric development for power supply to Rome.

Impianto Idroelettrico Dell' Aniene (78274 B). 2500 w. Ind—Mar. 25, 1917. 25,000 h.p. development on Aniene river for supplying electric power to Rome.

**Lake of the Woods**

Lake of the Woods To Be Regulated For Power (79387). 1500 w. Can Engr—June 21, 1917. Report of International Joint Commission is reviewed. Summary of conclusions and recommendations.

**Load Curves**

The Significance of Load Graphs (81537). Terrell Croft. 1800 w. Power—Oct. 2, 1917. Load curves for different classes of electric-power station loads.

**Loads**

Meeting Increased Load Demands (74585). Ills. 3500 w. Prac Eng, Chi—Nov. 15, 1916. Large hydraulic elevator pump, and modern air conditioning and sewage disposal apparatus added to power plant of Boston Store, Chicago.

Straightening Consumers' Load Curves (75476). J. E. Bullard. 2000 w. Elec Wld—Dec. 23, 1916. Industrial electric heating applications.

Analyzing Growth of Central-Station Load (76859). W. S. Leffler. Ills. 2500 w. Elec Wld—Feb. 24, 1917. Load-curve improvement.

The Electric Vehicle as a Load for the Central Station (78495 A). C. A. Rohr. 1000 w. Gen Elec Rev—May, 1917. Its desirability. Favors car-mile system of charges.

Building-Up Power Loads (79005). Ross L. Baker. 3000 w. Elec Jl—June, 1917. Suggestions tending to give success.

Load Characteristics of Some Large Central-Station Customers (79006). George E. McKana. 700 w. Elec Jl—June, 1917. Analysis of load curves.

The Disappearance of the Evening Peak (80198). William N. Neibich. Diagrams. 2000 w. Elec Wld—July 28, 1917. Growth of high-tension industrial load in Baltimore results in practical abolition of the evening peak.

**Manitoba**

Manitoba Water Powers (80398 A). 2000 w. Engng—July 20, 1917. Information from a recent report concerning policy for developing these vast water resources.

**Metering**

Die Verbesserung des Leistungsfaktors in Kraftwerken durch Tarifarische Massnahmen (81377 B). 2800 w. Schweiz Elek Ver Bul—Aug., 1917. Improvement in the load factor of central stations through selling energy by meter.

**Mississippi**

Water Power Development on the Mississippi River Above St. Paul (81256 A). R. D. Thomas. 10 pp. Af Eng Socs Minn, Bul—Sept., 1917. Outlines methods of control and direction, and factors responsible for existing conditions.

**New England**

Some Aspects of the Power Situation in New England (77663). Charles H. Bromley. Ills. 4000 w. Power—March 27, 1917. Data on central station and isolated plants with particular reference to Massachusetts.

Recent Power Supply Developments at Manchester, N. H. (77229). F. C. Doble. Ills. 1800 w. Elec Ry Jl—March 10, 1917. Improvements to meet a rapidly increasing load.

**New Jersey**

Current for the Public Service (80244 A). E. B. Meyer. Ills. 3000 w. A E R A—July, 1917. Details of the Essex power station, Newark, N. J.

**Norway**

The Vamma Power Station, Norway (80780 A). Ills. & Plate. 2500 w. Engng—Aug. 10, 1917. Account of this station on the Glommen River.

**Quebec**

Les Forces Hydrauliques De La Province De Québec (78251 B). A. Amos. 8500 w. Rev Tri Can—Feb., 1917. Rivers and streams capable of development.

**Pacific Coast**

Industrial Power on the Pacific Coast (82097 A). Henry James Kennedy. Ills. 6500 w. Ind Man—Nov., 1917. Imminence of a coal famine. Coal and oil supplies discussed.

**Parallel Operation**

The Parallel Operation of Electric Power Stations (76373 N). John S. Peck, with discussions. Ills. 30 pp. Inst E E, Jl—Jan., 1917. Engineering problems.

Discussion on "The Parallel Operation of Electric Power Stations" (77933 N). 4000 w. Instn E E, Jl—March, 1917. Paper by J. S. Peck.

**Power Factor**

Power Factor Explained (75455 A). F. A. Annett. Ills. 1500 w. Mach Wld—Dec. 8, 1916. Serial, 1st part.

**Power Plants**

Cadogan Power Plant (75050). Fred Norman. Ills. 2000 w. Cl Age—Dec. 2, 1916. Small compact plant generating alternating current.

Engineering Equipment of an Educational Institution (75067). Ills. 2500 w. Prac Eng, Chi—Dec. 1, 1916. Details of power plant of Univ. of Cincinnati.

Operation of the Pasadena, Calif., Municipal Plant (75064). 1500 w. Power—Dec. 5, 1916. Enviable record.

Power Plant at Fort Sill (75347). Irvin O. Montgomery. Ills. 1500 w. Prac Eng, Chi—Dec. 15, 1916. Light, refrigeration and heat furnished to army by modern plant burning fuel oil.

Singer Plant at South Bend (75391). Thomas Wilson. Ills. 4500 w. Power—Dec. 19, 1916. Concentration of two plants into one, with distribution.

The Passing of Harrison Street Station, Chicago (75241). A. Bement. Ills. 1200 w. Power—Dec. 12, 1916. Dismantled in less than three months.

The Walsall Extensions (75219 A). 3000 w. Elec Rev—Nov. 24, 1916. Details of improvements, with editorial on "Power Station Design."

Buffalo's Notable Power Plant (76660). Charles H. Bromley. Ills. 5000 w. Power—Feb. 13, 1917. Features of the new steam plant of Buffalo Gen. Elec. Co.

Economics of Power Plants (76566 A). 7000 w. E Cb Phila, Pro—Feb., 1917. Outline of some economic principles which should be considered in the generation and distribution of electricity.

Inclined Tunnels Buttress Power Plant (76862). Ills. 3500 w. Eng Rec—Feb. 24, 1917. Forty tunnels, driven to rock at angle of 50 degrees, permit increasing of head at Sault Ste. Marie, Mich.

Connecticut Company's Power Plant (78612). Ills. 1700 w. Elec Ry Jl—May 12, 1917. The new Grand Ave. plant in New Haven.

Power Plant Equipment and Practice (78618). Ills. 3500 w. Elec Wld—May 12, 1917. Report of prime mover committee to the N. E. L. A.

New Electric Power Plant at Windsor (78946). F. H. Bernhard. Ills. 2200 w. Elec Rev & Wes Elec—May 26, 1917. Efficient design and location at a coal mine on a large river promise great economy.

New Power House at Swift Rapids, Ont. (81097). Ills. 1800 w. Can Engr—Sept. 13, 1917. Interesting power development on Severn River for Orillia.

Circulating Water for Ashley Street Station (81336). John Hunter. Ills. 2000 w. Power—Sept. 25, 1917. Operating and construction features.

Operating Features of a Model Steam Electric Plant (81015). Ills. 1500 w. Elec Rev & Wes Elec—Sept. 8, 1917. Mechanical handling of coal and ashes.

Power Plant of the Rialto Building (81031). A. J. Dixon. Ills. 2000 w. Power—Sept. 11, 1917. Details of an old-fashioned Edison bipolar high-speed engine plant in a 10-story office building.

Unique Features of the New Power Plant at Murphysboro, Illinois (81014). Ills. 1200 w. Elec Rev & Wes Elec—Sept. 8, 1917. Serial, 1st part. Combination electric, water, and gas plant in a small city being reconstructed.

**Power Rates**

Power Rates Raised by Coal Cost (79264). 2200 w. Elec Wld—June 16, 1917. Cost and scarcity of fuel lead to advancement in rates.

**Power Stations**

Aurora, Elgin & Chicago R. R. Power Station (74294). Ills. 1800 w. Prac Eng, Chi—Nov. 1, 1916. Results of standardization of boiler conditions.

Features of New Jersey Company's Latest Station (76127). P. H. Chase. Ills. 2500 w. Elec Wld—Jan. 20, 1917. Switching and reactor arrangements, and apparatus for facilitating operation.

Gas-Steam Generating Units of 6000-H.P. (75655 A). Ills. 3000 w. Engr—Dec. 15, 1916. New plant at the Ford Motor Co.'s Works, Detroit.

Steam Station of Ohio State Power Company (75684). Ills. 1800 w. Elec Wld—Dec. 30, 1916. Features of the layout and equipment in a 15000-kw. station at Fremont, O.

The 210,000-Kw. Buffalo Steam Station (76331). Ills. 1200 w. Elec Wld—Jan. 27, 1917. Serial, 1st part. Interesting features.

See also WATER POWER, under TRANSMISSION and DISTRIBUTION.

**Protection**

Protection Des Installations Électriques contre Les Surtensions (78278 B). Ills. 2900 w. Ind Elec—Mar. 25, 1917. Modern methods of protecting installations against surges and other excessive voltages.

**Public Utilities**

Public Service and the Central Station (75366). Thomas Robson Hay. 2200 w. Elec Rv & Wes Elec—Dec. 16, 1916. Principles that should guide a public utility company.

**Pumping**

Reclamation Pumping a Profitable Power Load (79036). Richard M. Boykin. Ills. 2200 w. Elec Rev & Wes Elec—June 2, 1917. Electric power from Portland, Ore., furnished to three reclamation projects.

**Rates**

Problems in Rate Regulation Accentuated by Higher Operating Costs (75748). Halford Erickson. 4500 w. Elec Wld—Jan. 6, 1917. Troubles of rate making.

Can Central Stations Offer Lower Power Rates? (78908). F. Emerson Hoar. 2000 w. Elec Wld—May 26, 1917. Changed conditions making possible low-cost power in western states.

**Rate Schedules**

Making the Rates Carry the Coal Cost (79745). 2000 w. Elec Wld—July 7, 1917. Higher schedules made necessary by advance in fuel prices and scarcity in supply.

**Reactors**

Effect of Current Limiting Reactors on Turbo-Generator Systems Under Conditions of Short Circuit (76644 D). P. B. Juhnke. 10 pp. A I E E, Pro—Feb., 1917. Account of a cable breakdown.

Reactors in Hydroelectric Stations (76634 D). J. Allen Johnson. 3000 w. A I E E, Pro—Feb., 1917. The advantages and limitations in the use.

**Rehabilitation**

Rehabilitation Without Service Interruption (77216). 1200 w. Elec Wld—March 10, 1917. How a new 1800-kw. station was built on the site of an old power plant and new equipment installed.

**Remodeled Plant**

Ashley Street Station Remodeled (80224). John Hunter. Ills. 1500 w. Power—July 31, 1917. Re-equipping a plant at St. Louis, Mo., designed for 12,000 kw. to an ultimate capacity of 116,000 kw.

**Reservoirs**

Sulla sovvenzione de accordarsi per parte dello Stato ai costruttori di laghi artificiali (77595B). U. Puppini. 3600 w. Mon Tec—Feb. 20, 1917. Italian practice of State subsidies to those building reservoirs for hydraulic power plants.

**Russia**

Electricity Supply in Russia (79297 A). P. Gurewitsch. 3500 w. Elec'n—June 1, 1917. The supply before the war and its future development.

**Service**

The Essex Power Station (74968). Plate & Ills. 3500 w. Power—Nov. 28, 1916. New Jersey station built on the unit system. Most complete equipment.

Poor Service Causes Municipal Ownership (74419). Glenn Marston. 2200 w. Elec Rv & Wes Elec—Nov. 4, 1916. Importance of uninterrupted service.

Promoting Residential Service (74274). George P. Roux. 2000 w. Elec Jl—Nov., 1916. Rates, electrical appliances, etc.

Giving Twenty-four-Hour Service in Town of 2,000 (80326). R. E. Carlson. Ills. 1800 w. Elec Wld—Aug. 4, 1917. Local plant supplanted by transmission line service.

**Service Problems**

Small-Town Electric Service Problems (78531). Ills. 1000 w. Elec Wld—May 5, 1917. Steel poles used; steel-cored aluminum wire, etc.

**South Africa**

Union of South Africa Municipal Electrical Undertakings (81955 A). E. Poole. 3500 w. Elec Rev—Oct. 5, 1917. Serial, 1st part. Abstract of paper before Natal Soc. for Adv. of Sci. & Art. Concerning electrical undertakings, distribution, etc.

**Spain**

Die Wasserkraftanlagen Tremp und Seros (78302 B). A. Huguenin. Ills. 1500 w. Schweiz Bau—Apr. 7, 1917. Serial, 1st part. Large water power development for Barcelona Traction, Light & Power Co.

**Standardization**

The Standardization of Switch-gear and Instrument Connections (75222 A). Charles C. Garrard. 2000 w. Elec'n—Nov. 24, 1916. Points in connection with the standardization.

**Steam Power**

Production of Electricity by Steam Power (81796). Alex. Dow. Ills. 4000 w. Elec Rev & W Elec—Oct. 13, 1917. Serial, 1st part. Costs and economies.

**Steel Mills**

Central Station Power Supply to Iron and Steel Industry (81268 N). Joseph McKinley and Ray L. Baker. Ills. 1500 w. Assn I S E E—Sept., 1917. Recent developments to secure reliability of service.

**Substations**

The Canton Substation (77726). Ills. 1800 w. Prac Eng, Chi—April 1, 1917. Outdoor switchyard representing latest high tension practice.

Canton Substation for Receiving Power from Windsor Plant (79210). F. H. Bernhard. Ills. 3500 w. Elec Rev & Wes Elec—June 9, 1917. High-tension equipment of the outdoor type. Largest synchronous condensers ever built.

Static Sub-Stations (79292 A). 2200 w. Elec Rev—June 1, 1917. Critical discussion of various systems.

The Improvement of the Outdoor Substation (80063). M. M. Samuels. Ills. 3000 w. Elec Wld—July 21, 1917. Suggestions for changes in the design and arrangement.

**Supply**

Recent Developments in Electricity Supply at Keighley (79575 A). Harry Webber. Ills. 2200 w. Elec Rev—June 15, 1917. Particulars of recent extensions to the works, and the effects of the war.

Electricity Supply at Redditch (81834 A). Ills. 2200 w. Elec'n—Sept. 14, 1917. Changes to increase power facilities.

**Switchboards**

The Main Switchboard of the Johannesburg Municipal Electric Supply System (75153 N). J. H. Dobson. Ills. 3500 w. So Af Inst Elec Engrs, Trans—Sept., 1916. Detailed description.

The Ford Plant Switchboard (77086). Thomas Wilson. Ills. 2500 w. Power—March 6, 1917. Details of one of the largest d. c. switchboards in the world.

The Switchboard (78010 A). John W. Upp. Ills. 1400 w. Sib Jl Eng—April, 1917. Interesting features of switchboard practice.

Developments in Switchboard Apparatus (78496 A). Ills. 1500 w. Gen Elec Rev—May, 1917. New and modified apparatus and practice.

Developments in Switchboard Apparatus (79693 A). Ills. 1000 w. Gen Elec Rev—July, 1917. Details of recent improvements.

**Switches**

Forces Acting on Disconnecting Switches (77878). Julian Loebenstein. Ills. 600 w. Elec Wld—March 17, 1917. Results of tests to determine forces tending to open knife switches.

**Switzerland**

Das neue Elektrizitätswerk der Stadt Chur (76934 B). L. Kürsteiner. Ills. 1200 w. Schweiz Bau—Jan. 13, 1917. Serial, 1st part. Design and sections of the water conduit to the power house on the Plessur river, near Coire.

**The Hague**

Het Gemeentelijk electriciteitsbedrijf te 's-Gravenhage (80018 B). G. J. Th. Bakker. Ills. 4500 w. Ingr—June 16, 1917. Large steam turbine station for supplying electric energy at The Hague, Holland.

**Tottenham**

Visit to the Works of the Tottenham District Light, Heat and Power Company (79943 A). Plates & Ills. 2500 w. Engng—June 22, 1917. Detailed description; general arrangement of machines, switches, lines, etc.

**Transportation Problem**

Transportation of the Equipment for a Hydro-Electric Plant for an Inland South American Town (77799 A). E. F. Colyer. Ills. 1200 w. Gen Elec Rev—April, 1917. Difficult transportation of heavy machinery over mountainous country where wheeled vehicles were impossible.

**Utah**

Interesting Hydraulic and Construction Features of the Recent Power Developments of the Utah Power & Light Company (80109 A). L. M. Pharis. Map & Ills. 16 pp. Utah Soc Engrs, Jl—June,

1917. General description with details of unusual features.

**Victoria**

Generation and Supply of Electricity in Victoria (78639 N). H. R. Harper. 3300 w. Comwh Engr—April, 1917. Presidential address to the Victorian Inst. of Engrs. Progress since 1905.

**Volturno**

L'impianto idro-elettrico del Volturno (80741C). Ills. 1000 w. Soc Ing Arch Ital—Aug. 1, 1917. A 10,000 kw. hydroelectric installation for Naples.

**Water Powers**

Review of Last Year's Developments on Niagara and Other Power Situations (77225). Arthur V. White. Abstract of annual statement to the Commission of Conservation. 3500 w. Can Engr—March 8, 1917. Water powers; with reference to the coal problem.

**Windmill Plants**

Performance of Two Successful Windmill Generating Plants (76861). Frank S. Culver. Ills. 1500 w. Elec Wld—Feb. 24, 1917. Features of arrangements and results of tests.

**Winnipeg Plant**

High Pressure Plant Used as Standby (80771). Wilfrid Proctor Brereton. Ills. 1000 w. Can Engr—Aug. 23, 1917. Two generators connected to producer-gas engines at Winnipeg, and tied to booster pumps at main station.

**Wood Stave Pipe**

Modern Practice in Wood Stave Pipe Design and Suggestions for Standard Specifications (78311 D). J. F. Partridge. 35 pp. A S C E, Pro—April, 1917. Difference between the various grades of used pipe.

**Wood Waste**

Saw-Mill Waste for Generating Electricity (78018). J. B. Woods. Ills. 900 w. Elec Wld—April 14, 1917. How an Arkansas Lumber Co. has co-operated with a central station by supplying it with steam.

**Yadkin Development**

Famous Yadkin Development Nearing Completion. Also, On the Contractor's End of the Yadkin Development. And Three 31,000-hp. Turbines for Yadkin Plant (74661). Ills. 5700 w. Eng News—Nov. 16, 1916. Design and construction; equipment and methods; novel features of generating units.

Modern Turbines and New Power House Replace Earlier French Design of Yadkin River Power Project (74704). Ills. 3000 w. Eng Rec—Nov. 18, 1916. Insufficient provision for flood water required new design.

## GENERATORS AND MOTORS

**A. C. Generators**

Small Alternating Current Generators (76409 A). J. J. Kline. Ills. 3500 w. Gen Elec Rev—Feb., 1917. Suited for small communities beyond the economical reach of distribution systems.

Theory of the Single-Phase Alternating-Current Motor (75094 A). W. C. K. Altes. Ills. 5000 w. Gen Elec Rev—Dec., 1916. Serial, 1st part. Description, and theory discussed.

Air Filters (74466 A). 2500 w. Elec Rev—Oct. 20, 1916. Merits and demerits of the wet and dry types, used for cooling turbo-generators.

**Alternators**

Le Compoundage Des Alternateurs (80002 D). M. Latour. Ills. 4200 w. Soc Int Elec—May, 1917. Review of various methods of compounding a. c. machines both single and three phase.

Sur Les Alternateurs Compound (80031 D). R. V. Picou. Ills. 3300 w. Soc Int Elec—June, 1917. Discussion of M. Latour's paper on compounded alternators.

Parallel Operation of Alternators (81118). William Knight. 2000 w. Elec Wld—Sept. 15, 1917. Interactions between prime movers and the corresponding alternators.

**Armatures**

Direct-Current Armature Winding (75938). J. H. McIlroy. Ills. 3000 w. Elec Rv & Wes Elec—Jan. 13, 1917. Important features and construction.

The Manufacture of Armature Coils (75868). D. W. Perry. 2000 w. Elec Jl —Jan., 1917. Methods.

The Theory of Armature Windings (75628 N). S. P. Smith. Diagrams. 18 pp. Instn E E, Jl—Dec., 1916. Outlines the theory in machines with alternate north and south poles.

Repetitions of E. M. F. in Armature Windings (81345 A). C. C. Hawkins. 3000 w. Elec'n—Sept. 7, 1917. Serial, 1st part. A study of the conditions which fix whether an armature winding can or cannot be divided into portions which give an E. M. F. equal in amount and in phase with each other.

The Mathematical Treatment of the Magnetomotive Force of Armature Windings (81057 A). B. Hague. 25 pp. Instn E E, Jl—July, 1917. Part of an investigation aiming to give a complete analytical treatment.

**Asynchronous Machines**

Transient Conditions in Asynchronous Induction Machines and Their Relation to Control Problems (76640 D). R. E. Hellmund. Ills. 16 pp. A I E E, Pro—Feb., 1917. Considers conditions after certain changes in the circuit connections are made.

**Auxiliary Motors**

Auxiliary Motors and Control Gear for Steel Works (79933 A). Ills. 1500 w. Elec Rev—June 22, 1917. New types demanded for this service.

**Barge Motor**

A New Motor Installation for Barges (78990 A). Ills. 1500 w. Engr—May 11, 1917. Detailed description.

**Bearings**

Ball Bearings for Electric Motors (79396). H. N. Trumbull. Ills. 1800 w. Elec Rev & Wes Elec—June 23, 1917. Advantages resulting from their use.

**Brushes**

Dynamo Brushes (79608). Ills. 2500 w. Prac Eng, Chi—July 1, 1917. A study of their manufacture, characteristics and application.

Carbon Brush Life on Direct-Current Railway Motors (81621). J. S. Dean. Ills. 1500 w. Elec Jl—Oct., 1917. Outlines the various conditions of service showing how they effect the factors that are a function of brush life.

**Carbon Brushes**

The Development of Carbon Brushes (77543). E. H. Martindale. 1500 w. Elec Rv & Wes Elec—March 24, 1917. Serial, 1st part. Deals with the solution of commutator and brush troubles.

Manufacture, Selection and Use of Carbon Brushes (81272 N). E. H. Martindale. 4000 w. Assn I S E E—Sept., 1917. Methods of manufacturing, characteristics and their bearing on various kinds of service.

**Closed Windings**

Théorie Rationelle Des Enroulements Fermés (82017 D). A. Iliovici. Ills. 8700 w. Soc Int Elec—July, 1917. Theory of closed windings for armatures. Various windings compared and mathematical expressions deduced.

**Commutating-Pole Machines**

Commutating-Pole Machines With the Brushes Off Neutral (74269). R. L. Witham. 1800 w. Elec Jl—Nov., 1916. Conditions which may result.

**Commutation**

Commutation in Continuous-Current Machines (75796). A. M. Bennett. 2500 w. Power—Jan. 9, 1917. Process of commutating the current in the armature and methods of obtaining sparkless commutation.

Causes and Effects of Local Short-Circuit Current (79911). E. H. Martindale. Ills. 1500 w. Elec Rev & Wes Elec—July 14, 1917. Dscussion of commutation troubles and remedies suggested.

The Commutation of Large Continuous Current Generators and Rotary Converters Under Heavy Overload Conditions (81956 A). H. G. Bell. 3500 w. Elec'n—Oct. 5, 1917. Device, due to Miles Walker, allowing overloading without sparking.

**Commutator Motors**

Single-Phase Commutator Motors (81038). R. E. Hellmund. 2500 w. Elec Jl—Sept., 1917. Speed regulation in stator excited motors.

**Commutators**

Commutators and Brushes (77770). Gordon Fox. Ills. 3500 w. Power—April 3, 1917. Troubles and their causes, with recommendations for avoiding those usually met.

**Control**

Control of Electric Motors in Steel Mills (75084). H. F. Stratton. 5000 w. Blt Fc & Stl Pt—Dec., 1916. Operation. Diagrams, graphs, and connections.

Practical Talks on Controllers—Current-Limit Type (75486). M. D. Goodman. Ills. 1500 w. Power—Dec. 26, 1916. Operation explained.

Safety-First Starting Apparatus for Electric Motors (75063). A. P. Danz. Ills. 2200 w. Power—Dec. 5, 1916. Details of equipment for control of electric motors.

Generator Control (77344). Ills. 1800 w. Prac Eng, Chi—March 15, 1917. Serial, 1st part. Methods and apparatus employed.

Electric Control (78012A). L. L. Taturn. 2500 w. Sib Jl Eng—April, 1917. Important factors in the development of control.

Electric Motor Control Gear (79300 A). John T. Mould. Abstract of paper before the Assn. of Supervising Electricians. 5000 w. Mech Engr—June 1, 1917. Considers the higher and more automatic forms of control gear and their functions.

Development of Motor Control (80615). Ills. 2800 w. Elec Rev & Wes Elec—Aug. 18, 1917. Use of controller for starting, speed regulating, reversing and braking.

**Control Gear**

Control Gear for Auxiliary Electric Motors for Rolling Mills (79734 A). Ills. 2200 w. Engng—June 15, 1917. Details of special designs to ensure continuity of service.

**Controllers**

Practical Talks on Controllers—Series-Type Contactors (78543). Ills. 2200 w.

Power—May 8, 1917. Construction and operation.

Practical Talks on Controllers—Lockout-Type Contactors (78636). Ills. 1500 w. Power—May 15, 1917. Explains operating principles of a lockout-type magnet switch.

Practical Talks on Controllers—Lockout-Contactor Type (78935). Ills. 2500 w. Power—May 29, 1917. Operation of two types explained.

The Manufacture of Controller Drums (79291 A). R. K. Shield. Ills. 1200 w. Elec Rev—June 1, 1917. Processes of manufacture

Electric Controllers for Direct-Current Industrial Motors (80136). A. G. Popcke. Ills. 8500 w. Am Mach—July 26, 1917. Types and their uses illustrated.

Practical Talks on Controllers—A.-C. Contractor Switches (79793). B. W. Jones. Ills. 3000 w. Power—July 10, 1917. A comparison between the construction of d. c. and a. c. electro-magnetic switches.

Practical Talks on Controllers—Controllers for Wound-Rotor Motors (80616). B. W. Jones. Ills. 2000 w. Power—Aug. 21, 1917. Characteristics of squirrel-cage and wound-rotor types, explaining the operation of the latter.

Specifications for Controllers for Alternating-Current Industrial Motors (80556). A. G. Popcke. Ills. 1600 w. Am Mach—Aug. 16, 1917. Characteristics of a. c. motors as regards control. Types of controllers and resistors.

**Converters**

B. T. H. Rotary Converters (75884 A). Ills. 2000 w. Elec'n—Dec. 22, 1916. Serial, 1st part. Construction.

Voltage Regulation of Rotary Converters (77446 N). G. A. Juhlin. 7500 w. Instn E E—March, 1917. Methods of reactance control and booster control.

Synchronous Phase Converters (78971 A). E. S. Henningsen. Ills. 2000 w. Gen Elec Rev—June, 1917. Theory of the two types and the field of usefulness of each.

Voltage Regulation of Rotary Converters (79323 N). 5700 w. Instn E E, Jl—May, 1917. Discussions on paper of G. A. Juhlin.

Voltage Control of Commutating-Pole Synchronous Converters (80929). J. L. Burnham. Ills. 2500 w. Power—Sept. 4, 1917. Types, and the effect of the direct-connected booster upon the commutation.

**Crane Motors**

Nouvelle Méthode Pour Le Freinage Des Grues (76915 B). 1400 w. Ind Elec—Jan. 10, 1917. Method of controlling crane motors by modified resistances in the field.

**Cross Currents**

Cross-Current Predeterminations from Crank-Effort Diagrams (81521 A). Louis Illmer. Diagrams. 5000 w. A S M E, Jl—Oct., 1917. Research into cause of cross-current flow between paralleled alternators driven by reciprocating engines.

**D. C. Machines**

Modern Types of Direct-Current Machines. (74270). David Hall. Ills. 5000 w. Elec Jl—Nov., 1916. Revised from paper before the Assn. of Ir. & St. Elec. Engrs. Types and their efficiency.

Sur les Perfectionnements Apportés au Matériel des Sous-Stationés a Courant Continu (74862 B). P. Normier. 3700 w. Ind Elec—Oct. 25, 1916. Recent improvements in D. C. high tension apparatus.

Heating of Dynamo Electric Machines with Various Loads and at Different Speeds (79936 A). Magnus MacLean and D. J. MacKellar. Ills. 2000 w. Elec'n—June 22, 1917. Serial, 1st part. Tests on the effect of armature current and armature peripheral velocity on the temperature rise.

**D. C. Motors**

Moteurs Série A Courant Continu (76916 B). P. Normier. Ills. 4500 w. Ind Elec—Jan. 25, 1917. Characteristics and regulation of direct current series motors at various impressed voltages.

Speed Torque Curves of D. C. Motors (76856). B. H. Chatto. 900 w. Elec Rv & Wes Elec—Feb. 24, 1917. Rapid graphic method of determination; example.

Field Distortion in Direct-Current Machines (78473). R. W. Owens. 2200 w. Elec Jl—May, 1917. Considers application of compensating windings, the use of the commutating pole and the problem of commutation.

Direct-Current Railway Motors for Regeneration (81625). R. E. Ferris. 1500 w. Elec Jl—Oct., 1917. Changes in design necessary are more in nature of refinements of details than in fundamentals.

**Depreciation**

See same heading under INDUSTRIAL MANAGEMENT, *Finance and Costs*.

**Dynamo Efficiency**

The Influence of Temperature on the Friction Losses and Efficiency of Dynamos (75886 A). W. Peukert. Abstract trans. from *Electro. Zeit.* 1000 w. Elec'n—Dec. 22, 1916. Tests and results.

**Electrical Apparatus**

Some Improvements in Electrical Apparatus (77103 A). R. R. Smith. Read before Assn. of Min Elec Engrs. 1500 w. Mech Engr—Feb. 23, 1917. Points still needing improvement.

Some Improvements in Electrical Apparatus (79307 A). R. R. Smith. 1500 w. Mech Wld—June 1, 1917. Improvements in insulation, bearings, starters, switchgear, etc.

**Electrical Machinery**

Effect of Ventilation on the Heat Dissipated from the External Surface of Field Colis (74835 A). George D. Floyd. Ills. 1000 w. Sib Jl Eng—Nov., 1916. Investigations and results.

Temperature Distributions in Electrical Machinery (74679 D). B. G. Lamme. Ills. 17 pp. A I E E, Pro—Nov., 1916. Principles governing heat distribution and temperature in electrical apparatus.

Electrical Machinery Tests and Specifications Based on Modern Standards (77798 A). H. M. Hobart. 7500 w. Gen Elec Rev—April, 1917. Application of the American standardization rules to a concrete case.

Electrical Machinery Tests and Specifications Based on Modern Standards. (77486 D). H. M. Hobart. 28 pp. A I E E, Pro—March, 1917. Comparisons of standardization rules now in force.

Electric Converting Machinery (78992 A). C. S. Buyers. Ills. Read before Assn. of Min. Elec. Engrs. 4500 w. Ir & Cl Trds Rev—May 11, 1917. Details of converters in commercial use, discussing their suitability for colliery requirements.

Modern Dynamo Electric Machinery (79860 B). Alexander Gray. Ills. 34 pp. Fkn Inst, Jl—July, 1917. Serial, 1st part. Based on paper presented Feb. 8, 1917, before A. I. E. E. Recent developments in direct-current machinery.

**Electrical Repairs**

How to Overcome the Difficulties of Electrical Repairs (82098 A). C. W. Starker. 5500 w. Ind Man—Nov., 1917. Serial, 1st part. Advantages of selecting types for manufacture and standardizing.

**Electric Drive**

Tendencies of Motor Application (78965 A). W. L. Merrill. Ills. 1000 w. Gen Elec Rev—June, 1917. Reviews development, progress, and the latest type.

**Electric Motors**

The Care of Electric Motors (80430 A). F. Ashton. 2500 w. Mech Wld—July 27, 1917. Suggestions for care of brushes, commutators, armatures, etc.

**Electromagnetic Machines**

Notes on the Design of Electromagnetic Machines (80552 A). Stanley Parker Smith. Ills. 2500 w. Elec'n—July 27, 1917. Serial. This second part deals with a. c. generators—their theory and design.

**Electroplating**

Electroplating Generators (79973). Floyd T. Taylor. 4000 w. Brs Wld—July, 1917. Serial, 1st part. Read at A. E. S. convention. Useful information.

**End-Rings**

End-Rings (74733 A). R. Roberts. Ills. 1200 w. Elec'n—Nov. 3, 1916. Attempts to find a method for calculating deflections and stresses in end-rings.

**Exciters**

Reversal of Exciter Polarity (79202). M. A. Walker. 1000 w. Power—June 12, 1917. Explains how the polarity may be reversed and what steps may be taken to prevent this trouble.

**Frequency Changers**

Frequency Changers (76955 N). R. Townend. 7000 w. Instn E E—Feb., 1917. Questions involved in their use as electrical machines.

Frequency-Changer Sets (81866). Quintin Graham. Ills. 2500 w. Power—Oct. 16, 1917. Serial, 1st part. Construction, operation, application and characteristics of the synchronous type.

Le Fonctionnement Des Changeurs De Fréquence (82016 B). 2200 w. Ind Elec—Sept. 10, 1917. Review and discussion of Townsend's papers before British Institution of Electrical Engineers.

**Fuses**

Characteristics of Standard Inclosed Fuses (77215). Walter Arthur. 1800 w. Elec Wld—March 10, 1917. Performance of fuses under different operating conditions and effect of size of filler, etc.

**Generators**

Ueber Garantien und Messungen des Wirkungsgrades Electrischer Generatoren (74915 B). W. Kummer. 3200 w. Schweiz Elec Ver Bul—Oct., 1916. Guarantee and determination of efficiency of generators.

**Graphics**

Graphical Methods in Dynamo and Motor Performance and Control (74487 A). W. Manktelow. 1200 w. Mech Wld—Oct. 27, 1916. Serial, 1st part. Curves and graphical methods useful in dynamo and motor design and operation.

**Harmonics**

Pressure Harmonics in Polyphase Systems and Windings (77910A). B. Hague. 1200 w. Elec'n—March 16, 1917. Serial, 1st part. Properties are discussed and effects considered. Mathematical analysis of conditions.

**Induction Motors**

Locating Faults in Alternating-Current Induction Motors (75242). Ills. 1200 w. Power—Dec. 12, 1916. Methods of locating and repairing faults.

Proper Sizes of Conductors and Fuses for Induction Motors (75367). H. T. Hazlett. 2000 w. Elec Rv & Wes Elec—Dec. 16, 1916. Methods and problems involved.

Reconnecting Induction Motors—Rotating Magnetic Field (75967). A. M. Dudley. Ills. 2500 w. Power—Jan. 16, 1917. Serial, 1st part. On rewinding induction motors.

Adjustable Speed Polyphase Induction Motors (76837 A). F. Creedy. Ills. 3000 w. Elec'n—Feb. 2, 1917. Principles, advantages, and details of new motor.

Installation and Operation of Induction Motors (76501). 1800 w. Elec Rv & Wes Elec—Feb. 3, 1917. Report of Committee to Western Assn. of Elec. Inspectors.

Performance of Polyphase Induction Motors, Under Unbalanced Secondary Conditions (76641 D). A. A. Gazda. Ills. 10 pp. A I E E, Pro—Feb., 1917. Study of the operation, showing the practical advantages of using unbalanced secondary.

Speed Control of Induction Motors for Steel Mill Drive (76405 A). J. D. Wright. Ills. 3500 w. Gen Elec Rev—Feb., 1917. Late modification of the Scherbius system.

The Squirrel-Cage-Type Induction Motor and Its Wiring (76500). G. S. Lawler. Paper before W. Assn. of Elec. Inspectors. 3000 w. Elec Rv & Wes Elec—Feb. 3, 1917. Suggestions.

Calculating the Performance of Polyphase Induction Motors (77130). Luther H. James. 2500 w. Elec Jl—March, 1917. New method without unnecessary refinements.

Effect of Voltage or Frequency Variation on Induction Motor Characteristics (77126). L. W. Smith. 1500 w. Elec Jl—March, 1917. Shows that a change of less than 10 per cent. will not seriously effect the operation.

Reconnecting Induction Motors—Diagrams of Semi-Closed Slot Windings (77430). A. M. Dudley. Ills. 2500 w. Power—March 20, 1917. Typical windings, their advantages and disadvantages, with suggestions.

Reconnecting Induction Motors—Diagrams of Open Slot Windings (78030). A. M. Dudley. Ills. 2500 w. Power—April 17, 1917. Types of connections used.

Speed Control of Polyphase Motors (78168). Gordon Fox. Ills. 3500 w. Elec Rv & Wes Elec—April 21, 1917. Serial, 1st part. Methods of speed adjustment.

Winding Small Single-Phase Induction Motors (78474). C. A. M. Weber. Ills. 1000 w. Elec Jl—May, 1917. Methods for various types.

The Characteristics of Inductive Motors as Influenced by Changes (78970 A). J. T. Appleton. Curves. 1500 w. Gen Elec Rev—June, 1917. Features of motor operation.

Démarrage Des Moteurs D'Induction A Cage D'Écureuil (79404 B). A. Normier. 1500 w. Ind Elec—May 10, 1917. Comparison of different methods of starting induction motors having "squirrel-cage" winding.

Reconnecting Inductive Motors—Fractional-Pitch Windings (80225). A. M. Dudley. Ills. 3500 w. Power—July 31, 1917. Reasons for winding the coils less than full pitch and the effects on the operation.

Reconnecting Induction Motors—Changes in Voltage Only (81032). A. M. Dudley. Ills. 2500 w. Power—Sept. 11, 1917. Outlines considerations involved and gives practical examples.

**Industrial Controllers**

Industrial Controllers—With Particular Reference to the Control of Direct-Current Shunt Motors (76642 D). H. D. James. Ills. 20 pp. A I E E, Pro—Feb., 1917. Series of tests on standard motors equipped with automatic starters.

**Industrial Motors**

The Application of Motors in Industrial Work (78665 A). Frank Walker. Ills. 5000 w. Beama Jl—April, 1917. Helpful considerations in deciding the choice of mechanical transmission gear and related matters.

**Installation**

The Installation of Motors (75696). R. Thistlewhite. Ills. 1800 w. Power—Jan. 2, 1917. Serial, 1st part. Methods of grounding and insulating the motor frame.

**Internal Temperatures**

Internal Temperatures of A. C. Generators (76633 D). Ralph Kelly. 5000 w. A I E E, Pro—Feb., 1917. A comparison of typical test results and the corresponding calculated temperatures.

**Interpoles**

The Examination of Commutation Conditions in Interpole Machines (81061 A). Frederick Murgatroyd. 1200 w. Elec Rev—Aug. 24, 1917. Discusses methods of correctly ascertaining correct brush position and correct interpole field strength.

Interpole Motors (79239). Gordon Fox. Ills. 1500 w. rac Eng, Chi—June 15, 1917. Discussion of armature reaction and the use of commutating and regulating poles.

**Lubrication**

Fan-Motor Lubrication (78470). E. W. Denman. Ills. 2000 w. Elec Jl—May, 1917. Bearings adaptable for fan-motor use.

**Mill Motors**

Hazards of Low Voltage Mill Machinery (81806). C. A. Lauffer. Slightly abstracted. Read before Nat'l Safety Council. 3000 w. Met & Chem Eng—Oct. 15, 1917. Applies to circuits of 600 volts and under. Electrical injuries and their treatment. Precautions.

**Motor-Generators**

Description of the 1500 and 2000 kw., 3000-volt D. C. Motor-Generator Sets of the Chicago, Milwaukee & St. Paul Railway (74255 A). F. C. Helms and C. M. Fulk. Ills. 2500 w. Gen Elec Rev—Nov., 1916. Interesting features; operating characteristics and the ventilating scheme for the d. c. units.

Motor Generator Set for Operating Rolling Mills (75369). William Knight. 1500 w. Elec Wld—Dec. 16, 1916. Analysis of conditions under which a flywheel motor-generator may be used in steel mill work.

The Motor Generator in Mining (80195). Ills. 1500 w. Cl Age—July 28, 1917. Sketch of developments.

**Motor Manufacture**

Manufacture of Electric Motors (81245). C. W. Starker. Ills. 1500 w. Am Mach—Sept. 20, 1917. Serial, 1st part. Manufacturing methods in use at the East Pittsburgh plant of the Westinghouse Co.

**Motor Rating**

Note on the Rating of Intermittent Motors of Large Output (78820 A). H. H. Broughton. 800 w. Elec'n—May 4, 1917. Methods of determining the R. M. S. value.

**Motors**

Alternating-Current Single-Phase Commutator Motors (78972 A). L. F. Adams. Ills. 11500 w. Gen Elec Rev—June, 1917. Theory and operating characteristics of the common types Details of five types manufactured by the Gen. Elec. Co.

**Motor Specifications**

Basis for Motor Specifications (74404). J. H. Schakne. Ills. 700 w. Elec Wld —Nov. 4, 1916. How steam engine indicator and integrator are combined to approximate requirements of motors.

**Motor Starters**

Sur Les Procédés De Démarrage Des Moteurs Monophasés D'Induction (82018 D). J. Bethenod. 5600 w. Soc Int Elec —July, 1917. Theory of starters for single phase induction motors.

**Motor Starting**

Analysis of Starting Characteristics of Direct-Current Motors (76643 D). K. L. Hansen. 25 pp. A I E E, Pro—Feb., 1917. Mathematical.

**No-Voltage Protection**

Protecting Electric Machines Against No-Voltage (76662). H. M. Phillips. Ills. 1800 w. Power—Feb. 13, 1917. Different schemes.

**Parallel Operation**

Parallel Operation of Frequency-Changer Sets (74271). F. D. Newbury. Ills. 4000 w. Elec Jl—Nov., 1916. Synchronizing two frequency-changer sets, division of load, starting and stopping.

Parallel Operation of Commutating-Pole Machines (76400). W. B. Weaver. Diagrams. 2500 w. Elec Jl—Feb., 1917. Considers conditions to be met to insure successful operation.

Parallel Operation of Synchronous Converters on Both Alternating and Direct-Current Sides (79788). F. D. Newbury. Diagrams. 1000 w. Elec Jl—July, 1917. Methods of operating.

The Division of Load Among Alternating Current Machines in Parallel (78013 A). F. D. Newbury. Ills. 3500 w. Sib Jl Eng—April, 1917. Presents the subject with reference to synchronous frequency changer sets.

**Polyphase Motors**

Polyphase Alternating Current Commutator Motors with Shunt Characteristics (75982 A). Ills. 1200 w. Engr—Dec. 29, 1916. Details of an improved type.

Polyphase Motor Connection Diagrams (78475). A. M. Dudley. Ills. 1000 w. Elec Jl—May, 1917. First of a series of standard diagram connections, with explanatory notes.

Notes on the Polyphase Rotating Field (81037). H. S. Smith. 2500 w. Elec Jl—Sept., 1917. Description and graphical representation of this field.

**Railway Motors**

A Light-Weight Railway Motor (The GE-258) (74265 A). G. L. Schermerhorn. Ills. 1000 w. Gen Elec Rev—Nov., 1916. Details of a new light railway motor.

The Motor Used on the 300-Ton Locomotives of the Chicago, Milwaukee & St. Paul Railway (74249 A). E. D. Priest. Ills. 1000 w. Gen Elec Rev—Nov., 1916. Mechanical features of these motors.

Railway Motor Capacities and Ratings (81619). G. M. Woods. 1000 w. Elec Jl —Oct., 1917. Helpful suggestions for selection of equipment.

**Regulation**

Graphical Determination of Alternator Regulation (79889). A. S. Blatterman. 1500 w. Elec Wld—July 14, 1917. Method based on Potier's scheme of separating armature reaction and reactance and making use of power factor of load.

The Regulation Curve in Compound Generators (79789). L. C. McClure. 1300 w. Elec Jl—July, 1917. Explanation of methods.

**Resistors**

The Standardization of Resistors (79296 A). Ills. 1800 w. Elec'n—June 1, 1917.

Plea for standardization of ratings, arrangement and construction of starting and speed controlling resistors.

**Reversing Motor**

Reversing Roll Motors in Steel Mills (74268). W. R. Runner. Ills. 2500 w. Elec Jl—Nov., 1916. Details of the electric drive for reversing mills.

**Rheostats**

When May Alternator Field Rheostats Be Omitted? (76399). F. L. Moon. Diagrams. 3000 w. Elec Jl—Feb., 1917. Detailed discussion of questions involved.

**Rotary Converters**

Care and Maintenance of Rotary Converters (77102 A). Ills. 3000 w. Mech Engr—Feb. 23, 1917. Information of interest from a booklet issued by the British Westinghouse Elec. & Mfg. Co.

Voltage Reglulation of Rotary Converters (78822 N). G. A. Juhlin, with discussions. 21 pp. I E E, Jl—April, 1917. Reactance control and booster control.

**Series Motors**

Dynamic Braking Speed-Torque Curves of Series Motors (78968 A). James A. Jackson. Ills. 2200 w. Gen Elec Rev—June, 1917. Some of the more commonly used connections and the speed-torque curves that result.

**Shop Motors**

L'Énergie Électrique et la Production du Matériel de Guerre (76217 B). 1600 w. Ind Elec—Dec. 10, 1916. Design of motors for machines in munitions works.

**Single-Phase**

Single-Phase Motor Construction and Characteristics (78615). H. Weichsel and Terrell Croft. Ills. 1800 w. Elec Rev & Wes Elec—May 12, 1917. Serial, 1st part. Features of various classes of single-phase motors.

Single - Phase Commutator - Motors (80220). R. E. Hellmund. Diagrams. 4000 w. Elec Jl—Aug., 1917. Factors governing the choice of the motor type —commutation and torque conditions.

**Speed Control**

Double-Range System of Speed Control for Adjustable-Speed Induction Motors (79166). F. B. Crosby. Ills. 2500 w. Cl Age—June 9, 1917. Means for controlling the speed of mine fans.

**Starters**

An Automatic Starter for Induction Motors (80124 N). H. F. Stratton, with discussion. Ills. 30 pp. Ir & St E E, Assn—May, 1917. Details of the E. C. & M. automatic compensator—a starter for squirrel cage motors.

Motor-Starting Resistances (76974). A. E. Wells. Ills. 2000 w. Prac Eng, Chi —March 1, 1917. Details, with diagrams of connections, of various types of a. c. and d. c. devices.

**Steel Mill Motors**

I Metodi di Variazione della Velocità dei Motori Elettrici con Applicazioni Nelle Acciaierie (76211 B). C. Solari. Ills. 4500 w. Mon Tec—Nov. 30, 1916. Serial, 1st part. Methods of speed control for motors in steel mills.

**Stress**

Turbo Rotor Body Stress (81169 A). R. Roberts. 800 w. Elec'n—Aug. 31, 1917. Discusses stresses in a rotor core due to the teeth, and calculates the stresses in discs with teeth, with and without a central hole.

**Switches**

Split-Phase Motor Starting Switches (78476). F. S. Dellenbaugh, Jr. Ills. 1500 w. Elec Jl—May, 1917. Types described.

**Synchronous Machines**

Performance Curves of Synchronous Machines (75867). Q. Graham. 3500 w. Elec Jl—Jan., 1917. Necessary tests.

Synchronous Motor (75830). H. M. Phillips. 2200 w. Nat Engr—Jan., 1917. Field of usefulness limited.

Calculations for Synchronous Machines (76781). Theo. Shou. Diagrams. 2500 w. Elec Rv & Wes Elec—Feb. 17, 1917. Method of calculation for a. c. synchronous machines.

**Synchronous Motors**

Synchronous Motor Operation (80219). Ralph Kelly. 6500 w. Elec Jl—Aug., 1917. Explanations of the fundamental principles.

Synchronous Motor Operation (80931). Gordon Fox. Ills. 2000 w. Power—Sept. 4, 1917. Serial, 1st part. Construction and operating characteristics, particularly starting.

**Temperature Guarantees**

Rational Temperature Guarantees for Large A.-C. Generators (74680 D). F. D. Newbury. 13 pp. A I E E, Pro—Nov., 1916. Argument for the standardization of temperature guarantees when based on internal temperatures as measured by thermo-couples.

**Turbo-Generator**

The Large Turbo-Generator (81549 A). Richard H. Rice. Ills. 3300 w. Gen Elec Rev—Oct., 1917. Serial, 1st part. Abstract of an article read before the Am. Iron & Steel Inst. Reviews development in size and efficiency.

Turbo-Generator Operation (81799). 2200 w. Prac Eng, Chi—Oct. 15, 1917. Difficulties encountered and remedies.

British Westinghouse Turbo-Alternators (81838 A). Ills. 1800 w. Elec'n—Sept. 28, 1917. Details of manufacture.

**Underground Motors**

Installation and Maintenance of Underground Plant (78583 A). W. Matthew Baird. 5500 w. Ir & Cl Trds Rev—April 18, 1917. Instructions for the care and operation of underground electrical machinery.

**U. S. Generating Set**

The 25 Kw. Gasoline Driven Generating Set Used in the Coast Defenses of the United States (81889 B). Lorimer D. Miller. Ills. 25 pp. U S Art, Jl—July-Aug., 1917. Detailed description, and the events that led to its adoption.

**Voltage Regulation**

Automatic Voltage Regulators (76404). C. A. Boddie. Diagrams & Ills. 6000 w. Elec Jl—Feb., 1917. Outlines the development of automatic voltage regulations, their limitations and difficulties, with description of the new Westinghouse improved regulator.

**Windings**

Reconnecting Induction Motors—Types of Windings (76807). A. M. Dudley. Ills. 2500 w. Power—Feb. 20, 1917. Considerations affecting windings.

Part-Slot Fractional-Pitch Windings (77377). Theodore Schou. Ills. 2500 w. Elec Wld—March 17, 1917. Effect of armature winding distribution on the electromotive force wave shape as generated by non-sinusoidal field forms.

# ILLUMINATION

**Address**

Presidential Address to the Illuminating Engineering Society (81259 N). William J. Serrill. 15 pp. Ill Eng Soc—Sept., 1917. Justification of the Society, and discussion of the status and prospect of gas lighting.

**Arc Efficiency**

The Luminous Efficiency of the Radiation from the Electric Arc (76198 B). Enoch Karrer. 3000 w. Fkn Inst, Jl—Jan., 1917. Investigations.

**Artificial Light**

The Outlook in Illumination at an Important Period of Development (75754). Preston S. Millar. Ills. 2000 w. Elec Wld—Jan. 6, 1917. Development.

**Artificial Lighting**

Lighting in the Textile and Clothing Industry (80199). C. E. Clewell. Ills. 2000 w. Elec Wld—July 28, 1917. Artificial light requirements are considered and analyzed.

**Art Museum**

Lighting of the Cleveland Museum of Art (76091 C). Ills. 26 pp. Ill Eng Soc, Trans—Dec. 30 1916. Report of committee on lighting, submitted by E. P. Hyde, with discussion.

**Brightness**

On the Effect of Brightness of Light Source on General Illumination (76092 C). F. C. Caldwell, with discussion. Ills. 6 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Describes investigation and results.

Sensibility of the Eye to Varying Degrees of Light (75758). 1800 w. Elec Wld—Jan. 6, 1917. Study of the effect of glare and contrasts in brightness.

**Code**

Code of Lighting Factories, Mills, and Other Work Places (80333 A). Ills. 9500 w. E Cb Phila, Pro—Aug., 1917. Serial, 1st part. Prepared by committee of Illuminating Engineering Society.

**Color**

A Color Symposium (81702 N). In six parts, by M. Luckiesh, H. C. Richards, Beatrice Irwin, Leonard Thompson Troland, Irwin G. Priest, C. E. Ferree and G. Rand. 60 pp. Ill Eng Soc—Oct., 1917. Potentiality of color; physical point of view, illumination, psychology of color; work of Bureau of Standards; and experiments.

**Color Designation**

Fundamental Hue Scale for Scientific Color Designations (79896 A). Ills. 1800 w. Met & Chem Eng—July 15, 1917. Experiments of the Eastman Kodak Co.

**Colored Glass**

Colored Glass in Illuminating Engineering (76093 C). Henry Phelps Gage, with discussion. Ills. 57 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Transmission and absorption of the spectrum through glasses of different colors.

**Color Quality**

Commercial Uses for Filtered Light (77872). C. E. Clewell. Ills. 2000 w. Elec Rv & Wes Elec—April 7, 1917. Serial, 1st part. Development of the production of light of particular color quality, especially daylight value and its importance.

**Color-Technology**

The Physical Basis of Color-Technology (79862 B). M. Luckiesh. Ills. 21 pp. Fkn Inst, Jl—July, 1917. Serial, 1st part. Spectral analyses and their uses.

**Costs**

Reducing Operating Costs (81800). 2500 w. Prac Eng, Chi—Oct. 15, 1917. Saving by adapting 220-250 V. circuits to lamps of the 110-125 V. class.

**Daylight Illumination**

See same heading under CIVIL ENGINEERING, *Construction*.

**Department Stores**

The General Level of Illumination Intensities in Large Department Stores of New York City (81264 N). W. F. Little and J. F. Dick. 1000 w. Ill Eng Soc —Sept., 1917. Observations made in eight of the large stores.

**Economics**

Economics in the Operation of Large Lighting Installations (81263 N). Clarence L. Law and James E. Buckley. 13 pp. Ill Eng Soc—Sept., 1917. Methods employed where a reduction in the cost of lighting is to be effected.

War Economies in Lighting (75977 A). L. Gaster. 3000 w. Surv'r—Dec. 29, 1916. A study of lighting problems.

**Factory Lighting**

Legal Requirements of Factory Lighting (79363). C. E. Clewell. Ills. 3000 w. Elec Wld—June 23, 1917. Need of expressing lighting specifications in simple terms

Increased Production and Fewer Accidents Possible with Adequate Factory Illumination (79988). H. E. Murphy. 1500 w. Mfrs' Rec—July 19, 1917. Advantages from improved lighting conditions.

Lighting in Automobile Factories (79628). C. E. Clewell. Ills. 1500 w. Elec Wld—June 30, 1917. Relative costs, losses from poor lighting, with examples of good lighting.

Hints About Mill Lighting (79914). A. L. Powell. Ills. 1500 w. Eng & Min Jl—July 14, 1917. (Special.) Suggestions as to the selection of lights and reflectors.

Illuminating Iron and Steel Mills (80065). C. E. Clewell. Ills. 2000 w. Elec Wld—July 21, 1917. Analysis of lighting equipments and improvements.

Foundry and Machine Shop Lighting (79743). C. E. Clewell. Ills. 1800 w. Elec Wld—July 7, 1917. Requirements and results obtained, with recommendations.

Initial and Operating Cost of Factory Lighting (80600). C. E. Clewell. Ills. 1500 w. Elec Wld—Aug. 18, 1917. Cost values for different classes of wiring, with analysis of operating charges.

Operation and Upkeep of Factory Lighting Systems (80455). C. E. Clewell. Ills. 2000 w. Elec Wld—Aug. 11, 1917. Notes on systematic maintenance.

Timely Aspects of Factory Lighting (80908). J. J. Kirk. Ills. 1000 w. Elec Rev & Wes Elec—Sept., 1917. Maximum production depends on adequate industrial lighting.

**Fixtures**

Some Problems in the Design of Lighting Fixtures (76898 C). S. De Kosenko. Ills. 9 pp. Ill Eng Soc, Trans—Feb. 10, 1917. Reviews the development of fixture design.

**Flame Arc**

The Flame Arc in Chemical Manufacture (74452 B). W. R. Mott and C. W. Bedford. 5000 w. Jl Ind & Eng Chem —Nov., 1916. Effect of light on chemical reactions.

**Flaming Arc**

The Characteristics and Uses of the Flaming Arc (77613 A). William Roy Mott, with discussion. Ills. 6500 w. Clev Eng Soc, Jl—March, 1917. Especially as regards efficiency in relation to current and voltage, color of light, special flame carbons and uses.

Chemistry of the Flaming Arc, in Relation to Luminescence (78403 N). William Roy Mott. Ills. 4000 w. Am El-Chem Soc—May, 1917. Studies of magnified arc images, etc.

**Flood Lighting**

Flood Lighting for Typical Civic Celebration (74840). L. C. Porter. Ills. 1000 w. Elec Rv & Wes Elec—Nov. 25, 1916. 200th anniversary of Yale.

Use of Flood Lights in Industries (77089). Ills. 900 w. Fndry—March, 1917.

Floodlighting Outdoor Substations (78619). M. M. Samuels. Ills. 1000 w. Elec Wld—May 12, 1917. How difficulties have been overcome in a Massachusetts outdoor station.

Flood Lighting for Protection (80216). J. L. Stair. Ills. 1500 w. Elec Jl—Aug., 1917. Details of methods used in installing units.

Protection of Industrial Plants by Flood Lighting (80217). K. W. Mackall. Ills. 3500 w. Elec Jl—Aug., 1917. Suggestions for such installations, and methods used.

Protective Flood Lighting (80218). Samuel G. Hibben. Ills. 1700 w. Elec Jl—Aug., 1917. Flood lighting for police duty. The requirements.

Photometric Tests of Flood Lighting Projectors (80893 A). S. L. E. Rose. Ills. 1500 w. Gen Elec Rev—Sept. 1917. Outlines commercial tests.

The Many Uses of Flood Lighting (80905). 2500 w. Elec Rev & Wes Elec —Sept., 1917. Economy, advantages, etc.

Flood Lighting in the Oil Fields for Police Protection (81552 A). A. W. McBride and L. E. Mohrhardt. Ills. 500 w. Gen Elec Rev—Oct., 1917. Details.

**Gas Lamps**

The Growth and Present Status of Systems Used in the Maintenance of Gas Lamps in Residences (81261). E. B. Myers. 2000 w. Ill Eng Soc—Sept., 1917. Plans for maintenance of gas lighting equipments and the results.

**Glassware**

Recent Developments in Prismatic Glassware (74797 C). Howard L. Jenkins and George W. Roosa, with discussion. Ills. 1500 w. Ill Eng Soc—Nov. 20, 1916. Reflectors used to give proper illumination with concentrated filament lamps.

The Design and Manufacture of Diffusing Glass Shades (74801 C). S. G. Hibben. Ills. 38 pp. Ill Eng Soc—Nov. 20, 1916. Laws governing the manufacture.

**Globes**

The Purple Color of Lamp Globes (80237 A). M. Luckiesh. 1200 w. Gen Elec Rev—Aug., 1917. Shown to be due to manganese. Effect on light transmission.

**Good Lighting**

The Fundamental Principles of Good Lighting (77467 B). P. G. Nutting. 16 pp. Fkn Inst, Jl—March, 1917. Discusses the principles of efficient lighting to produce pleasing results.

**Home Lighting**

Gas and Electric Lighting in the Home (76094 C). C. H. French and C. J. Van Gieson, with discussion. 14 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Presents a plan for residence lighting.

**Human Eye**

Effects of Varying Light on Sensibility of Eye (81893 A). Edwin A. Hunger. Ills. 2200 w. Sib Jl Eng—Oct., 1917. Information of benefit to illuminating engineers.

**Illuminating Engineering**

See INDUSTRIAL MANAGEMENT, *Education.*

**Illumination**

Fluttuazione Di Luce Delle Lampade A Corrente Alternata (80701 B). G. Peri. 2600 w. Ind—July 11, 1917. Mathematical exposition of the current in an incandescent lamp filament at different frequencies of alternation.

**Incandescent Lamps**

Incandescent Lamp Policy of Edison Companies (74401). 1000 w. Elec Wld—Nov. 4, 1916. Report of Lamp Committee giving statistics of performance and suggested policy.

The Interpretation of Forced Life Tests of Incandescent Electric Lamps (74798 C). Leonard J. Lewinson, with discussion. 20 pp. Ill Eng Soc—Nov. 20, 1916. Purpose of life tests and objects attained; proper interpretations; methods, etc.

Progress Notes on Incandescent Electric Lamps and Lighting (79007). W. A. McKay and A. F. Folz. 2500 w. Elec Jl—June, 1917 Important developments.

Incandescent Electric Lamps and Lighting (79719 A). Unit Rasin. 3000 w. E Cb, Phila—July, 1917. Details of recently developed lamps, showing progress.

**Industrial Lighting**

Industrial Lighting by Electricity (74484 A). Frederick H. Taylor. 5000 w. Mech Engr—Oct. 27, 1916. Read before the Junior Inst. of Engrs. Lighting schemes; standards of illumination, etc.

What Adequate Lighting Means to Industries (79042). C. E. Cewell. Ills. 2500 w. Elec Wld—June 2, 1917. Serial, 1st part. Direct and indirect advantages of good light in the factory.

The Relation of Lighting to Industrial Safety (80904). John A. Hoeveler. Ills. 2500 w. Elec Rev & Wes Elec—Sept. 1, 1917. Serial, 1st part. Connection between poor lighting and industrial accidents.

**Inspection**

An Application of Probability to Inspection (76095 C). W. G. Houskeeper, with discussion. 13 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Method described.

**Integrating Sphere**

See MEASUREMENT.

**Lamps**

Tungsten Lamp Manufacture (75089 A). Charles Eisler. Ills. 4000 w. Machy—Dec., 1916. Processes used by the United Incandescent Lamp Co., Budapest, Hungary.

Modern Lamps and Industrial Applications (79148). C. E. Clewell. Ills. 2000 w. Elec Wld—June 9, 1917. Representative modern types are compared and their merits discussed.

**Lamp Specifications**

Zu den neuen Technischen Bedingungen für Glühlampen (80051 B). 8400 w. Schweiz Elek Ver Bul—June, 1917. New standard specifications for metallic filament lamps established by the Swiss Association of Electricians.

**Light Control**

Evolution of Light Projection (81146 C). C. A. B. Halvorson, Jr., and R. B. Hussey, with discussion. Ills. 5000 w. Ill Eng Soc, Trans—Aug. 30, 1917. History and development of light control.

**Lighting**

Proper Lighting by Legislation (76674). C. E. Clewell. Ills. 4500 w. Elec Rv & Wes Elec—Feb. 10, 1917. Analysis of recent legislation in regard to factory lighting, with suggestions.

The Possibilities of the Lighting Load (76858). William A. Durgin. 1800 w. Elec Wld—Feb. 24, 1917. Increase in lamp efficiency.

**Light Projection**

Practical Limitations in the Projection of Light (79685 A). J. A. Orange. Ills. 6 pp. Gen Elec Rev—July, 1917. Outlines a simple method of considering the important factors, discusses brightness and related topics.

**Local Lighting**

Local Lamp and Inspection Work Lighting (80327). C. E. Clewell. Ills. 2000 w. Elec Wld—Aug. 4, 1917. Cases of good and bad lighting; requirements.

**Machine Shops**

Electric Lighting in Machine Shops (78664 A). F. Ashton. 2000 w. Mech Wld—May 4, 1917. Various lighting systems.

**Museums**

Lighting the Cleveland Museum of Art (74544). Ills. 2500 w. Elec Rv & Wes Elec—Nov. 11, 1916. Serial. 1st part. Means applied to obtain effective lighting.

**Nomenclature**

1916 Report of the Committee on Nomenclature and Standards of the Illuminating Engineering Society (74799 C). 10 pp. Ill Eng Soc—Nov. 20, 1916.

**Office Buildings**

A Study of the Economics of Office Building Lighting (76089 C). Samuel G. Hibben, with discussion. Ills. 20 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Methods.

**Office Lighting**

Kinks and Stunts in Office Building Lighting (79004). Samuel G. Hibben. Ills. 1500 w. Elec Jl—June, 1917. Importance of clean fixtures, ventilation of globes, etc.

Illumination of Business Office Spaces (79888). C. E. Clewell. Ills. 1500 w. Elec Wld—July 14, 1917. Requirements and relative advantages of direct, indirect and semi-indirect lighting.

Gas and Electric Lighting on the General Offices of the Consolidated Gas Company (80444 C). Thomas Scofield and Clarence L. Law. Ills. 20 pp. Ill Eng Soc, Trans—July 20, 1917. Details of lighting this N. Y. building.

**Optic Projection**

Optic Projection as a Problem in Illumination (74795 C). J. A. Orange, with discussion. Ills. 25 pp. Ill Eng Soc—Nov. 20, 1916. Plea for abandonment of "point source" treatment of projection in favor of the rational method.

**Panama-Pacific**

Illumination of the Panama-Pacific International Exposition (79372 D). W. D'A Ryan. Ills. 25 pp. A I E E, Pro—June, 1917. Elaborately illustrated article.

**Progress Report**

Report of the Committee on Progress (81703 N). 65 pp. Ill Eng Soc—Oct., 1917. Annual report of past year; perfection of methods and appliances rather than striking developments.

**Projection**

Projection Engineering (76096 C). R. B. Chillas, Jr. 13 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Requirements to produce a steady picture, restful to the eye.

**Projectors**

The Theory and Practical Use of Projectors and Their Latest Application as Portable Signal Outfits (79686 A). L. C. Porter. Ills. 1500 w. Gen Elec Rev—July, 1917. Explanations of the effect of various factors on the projection of a beam of light.

**Publicity**

Illuminating Engineering Publicity (81262 N). G. H. Stickney. 2500 w. Ill Eng Soc—Sept., 1917. Suggestions.

**Public Ownership**

Poor Lighting Promotes Public Ownership (77846). C. E. Clewell. 2500 w. Elec Wld—April 7, 1917. Lesson from a Pennsylvania case.

**Rating**

Rating Artificial Lighting Systems (81920). Davis H. Tuck. 1500 w. Elec Wld—Oct. 20, 1917. A study of conditions affecting efficiency of illumination.

**Reflection**

The Laws of Reflection and Transmission of Light (76099 C). Thomas W. Rolph. Ills. 23 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Fundamental principles.

**Reflection Factor**

Measurement of Reflection Factor (78736). M. Luckiesh. 2500 w. Elec Wld—May 19, 1917. Importance of knowing coefficient of reflection; conditions which make its determination difficult; and how some obstacles may be overcome.

**Reflectors**

Reflectors for Glass Bowls (74796 C). J. L. Stair and J. A. Hoeveler, with discussion. Ills. 18 pp. Ill Eng Soc—Nov. 20, 1916. Auxiliary reflector equipment for use with ornamental glass bowls.

Some Experiments on the Eye with Pendant Reflectors of Different Densities (76097 C). C. E. Ferree and G. Rand, with discussion. Ills. 26 pp. Ill Eng Soc, Trans—Dec. 30, 1916.

Costliness of Light Absorption (78906). Roy Kegerreis. 2000 w. Elec Wld—May 26, 1917. Importance of preventing dust accumulation on reflectors and lighting fixtures.

**Report**

1917 Report of the Committee on Nomenclature and Standards of the Illuminating Engineering Society (81260 N). 11 pp. Ill Eng Soc—Sept., 1917. Recent work of this committee.

**Searchlamps**

Characteristics and Testing of War Searchlamps (80924). Samuel G. Hibben. Ills. 1500 w. Elec Wld—Sept 1, 1917. Sizes of electrodes for different diameter projectors, relation of focal length to diameter of mirror, etc.

**Searchlights**

The Sperry Searchlight (74760 A). Ills. 1200 w. Engng—Nov. 10, 1916. Detailed description.

Searchlights (75458 N). Capt. di Tondo, in *Rivista di artiglieria e Genio.* 4000 w. Roy Un Ser Instn—Nov., 1916. On improvements in the employment of searchlights in land warfare.

Searchlights (76788 B). Clair W. Baird and Edward P. Noyes. 23 pp. U S Art, Jl—Jan.-Feb., 1917. History and development.

The Sperry Searchlight (76836 A). Ills. 3300 w. Elec'n—Feb. 2, 1917. Account of its development, and details of mechanism.

**Seeing Quality**

I. Effects of Brightness and Contrast in Vision. P. G. Nutting. II. Apparent Brightness; Its Conditions and Properties. Leonard Thompson Troland (76088 C). 37 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Two papers discussed together.

**Show-Windows**

Effective Show-Window Lighting (78616). H. W. Mateer. Ills. 2000 w. Elec Rev & Wes Elec—May 12, 1917. Effects possible by special control of light direction and color.

**Statue of Liberty**

The Illumination of Liberty (75478). R. F. Carbutt and H. H. Magdsick. Ills. 900 w. Elec Wld—Dec. 23, 1916. Details of installation.

**Stores**

Latest Practice in Store Lighting (80776). H. T. Spaulding. Ills. 3000 w. Elec Rev & Wes Elec—Aug. 25, 1917. Types of lighting systems with suggestions and tables of applications.

**Street Lighting**

Effect of the Type "C" Lamp on Public Street Lighting (75092 A). John West, Ills. 2500 w. Gen Elec Rev—Dec., 1916. Read before New England Soc. of Nat. Elec. Lgt. Assn. Statements and tables showing results.

Electric Street Lighting in New York City with Particular Reference to the Borough of Manhattan (76098 C). W. T. Dempsey. Ills. 7 pp. Ill Eng Soc, Trans—Dec. 30, 1916. Reviews progress.

Electric Street Lighting in New York City, with Particular Reference to the Borough of Manhattan (75862). W. T. Dempsey, Ills. 2000 w. Elec Jl—Jan., 1917. From paper before Ill. Eng. Soc. History of progress.

Metodo Di Calcolo Della Illuminazione Stradale (76202 B). G. Peri, Ills. 3400 w. Ind—Dec. 3, 1916. Serial, 1st part. Method of computing distribution of light.

The New Elkhart Street-Lighting System (75936). Ills. 1700 w. Elec Rv & Wes Elec—Jan. 13, 1917. Conduit system for distribution in business district.

Group Street Lighting System for the City of Chicago (76408 A). William G. Keith. Ills. 2000 w. Gen Elec Rev—Feb., 1917. Novel system for large installations.

Phantom Circuit System for Controlling Street Lights (76412 A). A. H. Davis. Ills. 1000 w. Gen Elec Rev—Feb., 1917. Ingenious equipment and its operation.

Some New Developments in Ornamental Street-Lighting Fixtures (79008). Gilbert T. Dunklin. Ills. 2000 w. Elec Jl—June, 1917. Increased efficiency in lamps, improvements in post designs, etc.

Development of a Permanent Street Lighting Plan for a Small City and Village (81147 C). R. B. Thompson, with discussion. Ills. 2500 w. Ill Eng Soc, Trans—Aug. 30, 1917. Describes lighting work of one central station company.

Some Features of Street Lighting Specifications (81148 C). W. Edgar Reed, with abstracts of discussions. 2500 w. Ill Eng Soc Trans—Aug. 30, 1917. What they should include.

Standard Clauses for Street Lighting Specifications (81060 N). 2000 w. Instn E E Jl—July 1917. A "majority report" of specifications based on "minimum horizontal illumination."

Street Lighting for Small Cities and Towns (80923). James R. Cravath. Ills. 3500 w. Elec Wld—Sept. 1, 1917. Serial, 1st part. General principles considered such as shadows, glare, spacing, etc.

A Combination of Refractor and Diffusing Globe for Street Lighting (81928 C). Ward Harrison, with discussions. Ills. 13 pp. Ill Eng Soc, Trans—Oct. 10, 1917. Detailed description.

The Municipal Electric Lighting System, of Eugene, Oregon (81556 A. C. W. Geller. Map. 3000 w. Ore Soc Engrs, Jl—Sept., 1917. Historical résumé of the inception, growth and results.

**Studio Lighting**

Electric Lighting of a "Movie" Studio (74844). W. E. Brewster. Ills. 1500 w. Elec Wld—Nov. 25, 1916. Use of photographic blue-bulb lamps.

Lighting a Large Motion-Picture Studio (76110). J. Howard Sandidge. Ills. 2000 w. Elec Rv & Wes Elec—Jan. 6, 1917. Artificial lighting system.

**Subway Lighting**

. Apparent Sunlight for Underground Passage (80691). Ills. 1000 w. Elec Wld—Aug. 25, 1917. Daylight lamps with reflectors throw light through windows.

**Ultra-Violet Rays**

The Effect of Ultra-Violet Light on the Eye (75414 A). 1800 w. Elec'n—Dec. 1, 1916. Reviews recent work in this field. Also editorial.

## MEASUREMENT

**Angular Deviation**

Measurement of Angular Deviation (81550 A). R. E. Doherty. Ills. 1200 w. Gen Elec Rev—Oct., 1917. Describes a simple measuring apparatus and the method of using it.

**Busbars**

Graphical Design of Direct Current Busbars (75686). B. B. Hood. 800 w. Elec Wld—Dec. 30, 1916. Charts for determining proper current densities and for comparing the suitability of copper and steel.

**Compasses**

On the Manufacture and Testing of Prismatic Compasses (75623 A). F. E. Smith. Abstract of paper before the Optical Soc. 3500 w. Elec'n—Dec. 8, 1916. Possible errors, their detection and correction.

**Conductors**

Conductivity of Earth Conductors and Metallic Sheathing (78585 A). S. Simon. Read before Assn. of Min. Elec. Engrs. 1500 w. Ir & Cl Trds Rev—April 13, 1917. Methods of testing underground cable systems.

Repulsion Between Strap Conductors (81119). H. B. Dwight. 1500 w. Elec Wld—Sept. 15, 1917. Method of calculation which may be used in connection with wide, closely spaced busbars, or where the round-wire formula will not apply.

**Curves**

Analysis of Design-Constant Curves (80064). Théo. Schou. 1000 w. Elec Wld—July 21, 1917. How the design constant for synchronous machines is affected by the speed.

**Demand Meters**

Measuring Maximum Demands (75105). S. G. Hibben. Ills. 2500 w. Elec Jl—Dec., 1916. Design of demand meters.

**Dielectric Losses**

The Influence of Dielectric Losses on the Rating of High-Tension Underground Cables (79374 D). A. F. Bang and H. C. Louis. Ills. 3500 w. A I E E, Pro—June, 1917. Tests made to determine the dielectric losses in various kinds of 13000-volt cable.

Dielectric Losses in Insulating Materials (79371 B). C. E. Skinner. Ills. 48 pp. Fkn Inst, Jl—June, 1917. Measurement of insulating resistance, details of instruments used, and some characteristic results obtained.

**Disk Wheels**

Disk-Wheel Stress Determination (81548 A). S. H. Weaver. Charts. 1800 w. Gen Elec Rev—Oct., 1917. Simplified method of determining the centrifugal stresses in disk-wheel of given irregular shapes of section. Example.

**Dynamometer**

An Electric Dynamometer (81036). E. M. Olin and C. A. M. Weber. Ills. 2500 w. Elec Jl—Sept., 1917. A device for the calibration of electric motors and gasoline engines.

**Electrical Testing**

Some Problems Connected with Electrical Testing (77457 N). A. C. Hall, with discussion. 1800 w. S Af Inst of Elec Engrs, Trans—Dec., 1916. Discussion of earlier paper.

**Electricity**

The Measurement of Electrical Energy, Electricity Meters, Rates for Electrical Energy (76004 N). George C. Shaad and C. A. Johnson. Ills. 85 pp. Univ Kan, Bul. No. 8—June 1, 1916. Methods; types of meters; rates, etc.

**Electrolysis**

Electrolytic Equivalent of Gases (77739A). Carl Hering. 1800 w. Met & Chem Eng—April 1, 1917. Gives constants in their simplest form and based on the best known fundamental data.

**Electrometer**

A Self-Recording Electrometer for Atmospheric Electricity (79295 A). W. A. Douglas Rudge. 1000 w. Elec'n—June 1, 1917. Details of a new arrangement for meteorological work.

**Electrometric Titration**

A Convenient Apparatus for Electrometric Titration Depending on the Change of Oxidation Potential, and Its Application to the Determination of Small Quantities of Chromium in Steel (80280) B). G. L. Kelley, J. R. Adams, and J. A. Wiley. Ills. 1600 w. Jl Ind & Eng Chem—Aug., 1917. Describes apparatus and its use.

**Electroscopes**

On the Calibration and the Constants of Emanation Electroscopes (81138 B). O. C. Lester. Ills. 3000 w. Am Jl Sci—Sept., 1917. Reasons for discrepancies and the remedy suggested.

**Flow Meter**

The Flow Meter and Its Relation to Plant Economy (80233 A). J. H. Hough. Ills. 1800 w. Gen Elec Rev—Aug., 1917. Fields for the efficient use of the flow meter.

**Heat Losses**

Heat Dissipation a Problem in High-Rated Units (81298). George E. Luke. 1800 w. Elec Wld—Sept. 22, 1917. Outlines results of an investigation to determine the resistance to the flow of heat both along and across the laminations.

**High Frequency**

Measuring Feeble High-Frequency Currents (75642 A). Béla Gáti, in *L'Ind Elec.* Ills. 700 w. Elec'n—Dec. 15, 1916. Advantages of the barrette method.

**High Temperatures**

A Temperature Scale Adopted by the General Electric Company and the Radiating Properties of Tungsten with Reference to This Scale (81553 A). Edward P. Hyde. 1200 w. Gen Elec Rev—Oct., 1917. Method of finding the real temperature of a tungsten filament of a lamp under any given conditions.

**Inductances**

An Alternating Current Bridge Method of Comparing Two Fixed Inductances at Commercial Frequencies (80963 A). T. Parnell. Abstract of paper before the Physical Soc. 1500 w. Elec'n—Aug. 17, 1917. Explains method.

**Insulation**

Some Notes on the Measurement of the Insulation Resistance of a Live Three-Wire Network (79574 A). G. W. Stubbings. 2500 w. Elec Rev—June 8, 1917.

Testing Insulation of Generators in Motion (79147). E. O. Schweitzer. Ills. 1200 w. Elec Wld—June 9, 1917. Features of a test method

**Load Factors**

Load, Plant and Connected-Load Factors (77233). Terrell Croft. Ills. 1600 w. Elec Ry & Wes Elec—March 10, 1917. Serial, 1st part. Present article discusses load-factors, operating-time load-factors, and diversity factors.

**Magnetometer**

A Wehnelt Cathode-Ray Tube Magnetometer (75622 A). Charles T. Knipp and L. A. Welo. Abstract from *Phil. Mag.* Ills. 1500 w. Elec'n—Dec. 8, 1916. Details of instrument and its use.

**Magnets**

Note on the Testing of Magneto Magnets (79727 A). J. D. Morgan. Ills. 1200 w. Engng—June 15, 1917. Details of a magnetic balance developed by the author.

**Measuring Gases**

Measuring Gases by a Standard Orifice (75835). Thomas G. Estep, Jr. Charts. 1200 w. Bt Fe & Stl Pt—Jan., 1917. Adapting the orifice to the measurement of large gas volumes.

**Meter Reading**

Some Suggestions for the Prevention of Mistakes in Meter Reading (81712 A). G. W. Stubbings. 1700 w. Elec Rev—Sept. 21, 1917. Mistakes made. Suggests a set of instructions for meter reading.

**Meters**

Errors of Direct Current Ampere-Hour Meters (76885 A). 1200 w. Elec Rev—Feb. 2, 1917. Theoretical investigation.

The Root Mean Square Current Meter (76401). D. C. Hershberger. Ills. 2500 w. Elec Jl—Feb. ,1917. The principle, installation, operation, test results, applications, etc.

Electricity Meters (77105 A). J. Rennie. Abstract of paper before Assn. of Sup. Electn's. 4000 w. Mech Engr—Feb. 23, 1917. Types and methods evolved, testing, etc.

Ordonnance concernant la verification et le poinconnage officiels des compteurs d' électricité (77565 B). 7000 w. Schweiz Elek Ver Bul—Jan., 1917. Standard specifications for testing and stamping electricity meters.

Recording Watts and Volt-Amperes Simultaneously (77055). Henry H. Lyon. Ills. 600 w. Elec Wld—March 3, 1917. Details of a motor-driven, graphic-recording meter.

Methods and Cost of Meter Reading at Terre Haute, Ind. (77991). Jay A. Craven. 1600 w. Eng & Con—April 11, 1917. Details of methods adopted.

Remarques sur l'ordonnance Fédérale Concernant la Vérification des Compteurs d'électricité (78269B). A. Filliol. 3500 w. Schweiz Elek Ver Bul—Feb., 1917. Discussion on Swiss law concerning electric meters.

Characteristics of Maximum Demand Meters (78907). W. F. Kimball. 1800 w. Elec Wld—May 26, 1917. Performance, uses, and limitations of the two chief types.

Testing Meters on Ohio System (78737). G. A. Mullen. Ills. 700 w. Elec Wld—May 19, 1917. Method of work employed.

**Meter Testing**

Developments in Meter Testing Methods and Apparatus (74528). Otto A. Knapp. Ills. 3000. Elec Wld—Nov. 11, 1916. Improvements upon early methods and the so-called "load-applying" method.

Testing Primary Watt-Hour Meters (79395). K. H. Bausman. Ills. 2500 w. Elec Rev & Wes Elec—June 23, 1917. Outlines the principal tests and adjustments

**Motor Slip**

Accurate Method of Measuring Motor Slip (80692). Milton M. Flanders. Ills. 800 w. Elec Wld—Aug. 25, 1917. Contactor on motor shaft connected with relays so that slip is automatically recorded.

**Oil Switches**

Tests on Oil Switches (81344 A). Dr. Georg Stern and Josef Biermanns. Abstract from *Elek. Zeit.* Ills. 3000 w. Elec'n—Sept. 7, 1917. Describes a permanent testing station for studying the operation of oil switches, and also tests performed.

**Oscillograms**

Analysis of Short-Circuit Oscillograms (76407 A). O. E. Shirley. Ills. 2000 w. Gen Elec Rev—Feb., 1917. A simple method of analyzing oscillographic records.

**Phase Sequence**

The Determination of the Sequence of Phases from Wattmeter Readings (78823 N). Dr. Gisbert Kapp. 1200 w. I E E, Jl—April, 1917. Explains method. Mathematical treatment.

**Photometry**

An "Average Eye" for Heterochromatic Photometry, and a Comparison of a Flicker and an Equality-of-Brightness Photometer (79177). E. C. Crittenden and F. K. Richtmyer. 26 pp. U S Bur Stds, Sci paper 299—May 26, 1917. Report of experimental research work of great value.

**Pole-Finders**

Pole-Finders for Alternate Current (77000 A). A. Bruckmann. 1000 w. Diagrams. Elec'n—Feb. 9, 1917. Abstract translation from *Elektro Zeit.* Measuring instruments and their use.

**Power Factor**

Calcul Du Facteur De Puissance D-Un Réseau Triphasé (77599 B). A. Castex. Ills. 1500 w. Ind Elec—Feb. 25, 1917. Calculation of power factor in a 3-phase system by the method of two wattmeters.

**Reactors**

Repulsion and Mutual Inductance of Reactors (79263). H. B. Dwight. 2000 w. Elec Wld—June 16, 1917. Considerations found necessary when installing coils with parallel axes.

**Resistance**

Skin-Effect Resistance Measurements of Conductors at Radio-Frequencies Up to 100,000 Cycles Per Second (77268 n). A. E. Kennelly and H. A. Affel. Read before Inst. of Radio Engrs, May 3, 1916. Ills. 52 pp. Mass Inst Tech, Bul No. 13—Dec., 1916. Experimental data based on recent work.

The Resistance of Earth Connection (79294 A). L. Birks and E. Webb. Abtract of paper before the Phil. Inst. of Canterbury, N. Z. 3000 w. Elec'n—June 1, 1917. Results of measurements on high voltage electric power transmission lines for ground connections.

Measurement of Ground Resistance (79256). 4000 w. Elec Rev & Wes Elec—June 16, 1917. Methods for measuring the resistance of earth connections. Summary of work by the Bureau of Standards.

A Resistance Bridge for Workshop Use (79573 A). Oscar de Wette. Ills. 500 w. Elec'n—June 8, 1917. Data and features of arrangement.

**Rheostats**

Resistance Stepping of Motor Accelerating Rheostats (75641 A. L. Boothman. 1200 w. Elec Rev—Dec. 15, 1916. The determination of necessary data.

**Short Circuit**

Short Circuit Currents on Grounded Neutral Systems (78975 A). W. W. Lewis. Ills. 1200 w. Gen Elec Rev—June, 1917. Outlines a method of calculating single-phase short-circuit current.

Limiting Alternator Short-Circuit Currents (81018). Ralph Bown. Ills. 1800 w. Elec Wld—Sept. 8 1917. Resistance added to field circuit causes rapid decline of transient short-circuit current.

**Telephone Wires**

Measuring Insulation Resistance of Telephone Wires (75267). W. R. Baker. Ills. 1200 w. Telephony—Dec. 9, 1916. Reasons for operations necessary to determine insulation of toll lines.

**Testing Problems**

Some Problems Connected with Electrical Testing (76372 N). A. C. Hall, with short discussion. Diagrams. 7000 w. So Af Inst Engrs, Trans—Oct., 1916. Problems commonly met in the testing department.

A New Method of Artificially Loading Generators for Test (77802 A). Robert Treat. Ills. 1200 w. Gen Elec Rev—April, 1917. Advantages and instructions.

**Time Element**

The Influence of the Time Element on the Resistance of a Solid Rectifying Contact (75415 A). David Owen. Abstract of paper before Physical Soc. of London. 2500 w. Elec'n—Dec. 1, 1916. Method of measurement and interpretation of results.

**Torque**

The Determination of the Torque of a Direct-Current Meter (78985 A). E. Alberti. Abstractof an article in *Elektro. Zeit.* 1200 w. Elec'n—May 11, 1917. Details of an apparatus of the registering type that adjusts itself.

**Transformers**

Improved Method of Testing Current Transformers (81637). Francis B. Silsbee. Ills. 1200 w. Elec Wld—Oct. 6, 1917. Method more sensitive than absolute method.

**Voltage**

Voltage Standardization (79687 A). M. D. Cooper. 1200 w. Gen Elec Rev—July, 1917. Benefits that would result.

**Voltmeters**

Discussion on "The Corona Voltmeter" (Whitehead-Pullen), Cleveland, Ohio, June 29, 1916 (74681 D). 9 pp. A I E E, Pro—Nov., 1916.

**Voltmeter Shunt**

A Two-Reading Voltmeter Shunt (81295). Edw. J. Creel. 1500 w. Telephony—Sept. 22, 1917. Inexpensive device for measuring resistance and locating certain kinds of line trouble from the wire chief's desk.

**Watt-Hour Meters**

Direct-Current Watt-Hour Meters (81170 A). B. Ziegenberg. Ills. Abstract from *Electro. Zeit.* 1500 w. Elec'n—Aug. 31, 1917. Types and their defects.

**Wattmeter**

A New Concentric Standard Dynamometer Wattmeter for Heavy Currents: and Concentric Non-Inductive Standards of Low Resistance (79322 N). A. E. Moore. Ills. 15000 w. Instn E E, Jl—May, 1917. Causes of defects, progress of constructon of current coils, comparative tests, etc.

**Water Rheostats**

Water-Rheostat Construction (80362). Norman L. Rea. Ills. 1200 w. Power—Aug. 7, 1917. Different types and factors that determine their limitations.

**Wave Meters**

. Harmonic Method of Calibrating a Wave Meter (81926 D). E. Leon Chaffee, with short discussion. 5 pp. Inst Rad Engrs, Pro—Oct., 1917. Details of requisite procedure.

## POWER APPLICATIONS

**Agriculture**

The Use of Ionized Air in Agriculture (74556 A). Ingvar Jorgensen. Ills. 1600 w. Elec Rev—Oct. 27, 1916. Serial, 1st part. Information from experiments in Copenhagen and in United States.

Electro-Culture as a Central-Station Possibility (78362). F. S. Fletcher. 1000 w. Elec Rev & Wes Elec—April 28, 1917. What past experiments demonstrate.

Vermehrte Verwendung von Elektrizität in der Landwirtschaft (79413 B). F. Ringwald. Ills. 1400 w. Schweiz Elek Ver Bul—May, 1917. Recent applications of electric power to farming.

Electro-Cuture and Crop Production: Results During 1916 (78982 A). Ills. 900 w. Elec Rev—May 11, 1917. Beneficial results.

Electro-Culture of Crops (82038). 2000 w. Times Eng Supp—Sept. 28, 1917. Recent developments and some of the results so far achieved.

L'Emploi De L'Air Ionisé En Agriculture (82015 B). 1900 w. Ind Elec—Sept. 10, 1917. Use of ionized air in agriculture. Arrangement of apparatus.

**Auto Factories**

Electric Power Widely Used in Automobile Factories (79992). C. E. Clewell. Ills. 3000 w. Auto—July 19, 1917. Its economy.

**Automobiles**

See Electric Vehicles, under MECHANICAL ENGINEERING, *Automobiles.*

**Bakeries**

Baking by Electricity (76185 A). G. Basil Barham. 2200 w. Elec Rev—Jan. 5, 1917. Economy and advantages.

**Baking**

Low Temperature Electro-Thermal Processes (78410 N). C. F. Hirshfeld. Ills. 14 pp. Am El-Chem Soc—May, 1917. Practical application.

**Book Binding**

Electricity in Book Binding Plants (76855). Ills. 1500 w. Elec Rv & Wes Elec—Feb. 24, 1917. Details of processes; selection of motors.

**British Farming**

Some Considerations Affecting the Use of Electricity in Agriculture (76542 A). 2200 w. Elec Rev—Jan. 19, 1917. Serial. 1st part. Critical discussion of British farming methods; the value of electro-culture.

**Canal Haulage**

Electric Haulage on Canals (81422). 1400 w. Times Eng Supp—Aug. 31, 1917. Application to Harecastle Tunnel on the Trent and Mersey Canal, England.

**Canals**

The Importance of Canal Development to the Electrical Man. (78657 A). W. T. Wardale. 1500 w. Elec Rev—April 27, 1917. How they will assist the development of electrical power supply.

**Cement Plant**

A Completely Electrified Cement Plant (79257). Ills. 1800 w. Elec Rev & Wes Elec—June 16, 1917. Features of plant of the Oregon Portland Cement Co.

**Collieries**

Electric Supply to Collieries (78586 A). G. S. Corlett, with discussion. 3000 w. Ir & Cl Trds Rev—April 20, 1917. Points to be considered.

**Colombia**

The Electrical Industry of the Andes: The Republic of Colombia (80495 N). G. Forero. 2200 w. Beama Jl—July, 1917. Account of a typical case of Colombian enterprise.

**Construction Work**

Electricity in Construction Work (78947). H. O. Stewart. Ills. 3500 w. Elec Rev & Wes Elec—May 26, 1917. Serial, 1st part. Advantages of electrically driven machines for contractors and builders.

**Conveyors**

Handling Salt by Electric Tramway (76780). Albert Marple. Ills. 1200 w. Elec Rv & Wes Elec—Feb. 17, 1917. Unique bucket conveyor system for transporting salt over a mountain range.

**Cooking**

Electric Cooking and Heating (74734 A). A. F. Berry. 2500 w. Elec'n—Nov. 3, 1916. Considers its worth and cost.

Winning the Electric Cooking Load (74842). S. M. Kennedy. Ills. 2500 w. Elec Wld—Nov. 25, 1916. The value of the cooking load and its development.

Zur Frage des Elektrischen Kochens (74916 B). R. Krutina. Ills. 2100 w. Schweiz Elek Ver Bul—Oct., 1916. Discussion of the cost of electric cooking.

Der gegenwärtige Stand der Technik der elektrischen Kochapparate (77564 B). Ills. 10,000 w. Schweiz Elek Ver Bul—Jan., 1917. Report of Swiss Engineers' committee on improved electric cooking and heating apparatus.

Electric Cooking in Small Cities (78540). J. Paul Clayton. Ills. 3000 w. Elec Rev & Wes Elec—May 5, 1917. Activities of the Central Illinois Public Service Co.

The Present Position of Electric Cooking Apparatus (79571 A). 4000 w. Elec'n—June 8, 1917. Report of investigations on cooking with a view to the improvement of apparatus.

See same heading under *Central Stations.*

**Cotton Mills**

Electric Drive for Cotton Mills and the Advantages of Central Station Service (79684 A). J. E. Mellett. 10 pp. Gen Elec Rev—July, 1917. Advantages in general and details of applications.

**Dairies**

Power for Dairy Products (81499). Ills. 2000 w. Prac Eng, Chi—Oct. 1, 1917. St. Louis dairy supplies its own heat, light, power and refrigeration.

**Domestic Economy**

The Economy of Electricity in Small Households (74471 A). W. B. Smith. Abstract of paper read before Greenock Elec. Soc. 2500 w. Elec'n—Oct. 20, 1916. Its use for lighting, heating, cooking, etc.

**Domestic Engineering**

Electric Drive in Domestic Engineering (76403). Bernard Lester. Ills. 2200 w. Elec Jl—Feb., 1917. Possibilities in the use of electrically-operated labor-saving devices.

**Dry Docks**

Electric Power in Dry-Dock Operation (78361). Ills. 1500 w. Elec Rev & Wes Elec—April 28, 1917. Application in a S. Chicago dock.

Electric Power in Dry Dock Operations (79839). Ills. 1500 w. Elec Rev & Wes Elec—July 7, 1917. Electrical equipment of typical plant at Chicago.

**Electric Drive**

Electric Drive for Sewing Machines (77127). J. R. Cook. Ills. 2000 w. Elec Jl—March, 1917. Equipment and methods.

Motor Drives in a Screw and Bolt Plant (77380) L. J. Lamberger. Ills. 1500 w. Elec Wld—March 17, 1917. Factory layout in Pittsburgh, Pa.

**Electric Furnaces**

The Greaves-Etchells Electric Furnace (76846 A). Ills. 1500 w. Ir & Cl Trds Rev—Feb. 2, 1917. British design and construction. An installation.

Electric Furnace in the Brass Foundry (76437 A). Ills. 1500 w. Iron Age—Feb. 1, 1917. Feature of a Buffalo plant.

Electrical Characteristics of Electric Furnaces (78411 N). A. A. Meyer. Ills. 25 pp. Am El-Chem Soc—May 1, 1917. Electrical investigation of a Heroult and of a Grönwall electric steel furnace.

Rennerfelt Electric Furnace Operation (78396 S). C. H. vom Bauer. Ills. 1000 w. Am El-Chem Soc—May, 1917. Improvements intended to better adapt the Swedish design to American practice.

The Bethlehem 10-Ton Girod Steel Furnace (78395 N). C. A. Buck. 1500 w. Am El-Chem Soc—May, 1917. Details of the furnace and its operation.

The Greaves-Etchells Electric Furnace (78565 A). Ills. 1500 w. Elec Rev—April 13, 1917. Details of a new design.

Electric Furnace in Making Special Steel (78480). Charles C. Lynde. Ills. 1200 w. Bt Fc & Stl Pt—May, 1917. Installation and method of control.

A Switchboard for Experimental Electric Furnace Work (78398 N). W. L. Badger. Ills. 800 w. Am El-Chem Soc—May, 1917. Cheaply-constructed switchboard for laboratory use.

**Electric Ovens**

Electric Enameling Ovens at Ford Plant (81016). Ills. 1000 w. Elec Rev & Wes Elec—Sept. 8, 1917. Saving in time and labor. Improvement in quality.

**Electric Power**

Electrical Equipment of the Reo Plant (78169). Ills. 1500 w. Elec Rv & Wes Elec—April 21, 1917. Extensive electrical installation in a large automobile factory in Michigan.

Central Station Power in a Veneer Plant (78000). Ills. 1500 w. Elec Rv & Wes Elec—April 14, 1917. Details of motor equipment in a typical plant.

Industrial Power (78007A). David B. Rushmore. Ills. 2500 w. Sib Jl Eng—April, 1917. Tendencies in the generation, tranmission and applications.

Some Notes on the Electrical Driving of Workshops and Factories (78191A). A. T. Bullen. 2200 w. Elec Rev—March 30, 1917. Importance of proper installation. Advantages and costs.

Some Points for the Board of Trade Committee on Electric Power (78659 A). 1700 w. Elec'n—April 27, 1917. Questions relating to the economical supply of electric power in England.

**Electric Range**

Electric Range campaigning by the Central Station (81546 A). Hartwell Jalonick. 4000 w. Gen Elec Rev—Oct., 1917. Instructions and recommendations, with history of the campaign of the Texas Power & Light Co.

**Electric Steel**

Comments on the Electric Steel Industry (78400 N). John A. Mathews. 2200 w. Am El-Chem Soc—May, 1917. Review of development and achievements.

Notes on Electric Steel Melting (78409 N). J. L. Dixon. 9 pp. Am El-Chem Soc—May, 1917. Details of the furnace, the electrical factors, etc.

Progress of the Electric Steel Industry 78591 A). John A. Mathews. 2500 w. Iron Age—May 10, 1917. Early history; practical results to date.

Electric Process for Small Steel Castings (78590 A). R. F. Flintermann. From paper before Am. Elec-Chem. Soc. 2500 w. Iron Age—May 10, 1917. Reversed duplexing process.

**Electro-Culture**

Electric Discharge and Crop Production (80536 A). Ills. 4500 w. Engr—July 27, 1917. Work in this field in recent years, and work to be undertaken.

**Electro-Therapeutics**

The More Recent Applications of Electricity in the Present War, Especially in the Treatment of Diseases and Wounds Arising Therefrom (79578 A). W. Leeming. Ills. 3500 w. Elec Rev—June 15, 1917. Details of cases which have yielded to electrical treatment.

**Electrotyping**

Electricity in Electrotyping Plants (76358). Ills. 3500 w. Elec Rv & Wes Elec—Jan. 27, 1917. Processes, application of electric power, and details of a typical plant.

**Enameling**

The Application of Electricity to Enameling and Japanning (78467). Wirt S. Scott. Ills. 2500 w. Elec Jl—May, 1917. Equipment, quality of product, advantage, etc.

**Fume Precipitation**

Some Theoretical Aspects of Electrical Fume Precipitation (78394 N). W. W. Strong. Ills. 15 pp. Am El-Chem Soc—May, 1917. Development described. Corona discharge discussed, etc.

**Grain Elevator**

Electricity in a Large Grain Elevator (76673). T. H. Kettle. Ills. 2000 w. Elec Rv & Wes Elec—Feb. 10, 1917. Details of installation at Minneapolis.

Power Requirements of Grain Elevators (79626). F. F. Espenschied. 3000 w. Elec Wld—June 30, 1917. Performance data of six motor-driven, terminal grain elevators at Port Arthur and Fort William, Ontario.

**Heating and Cooking**

Elektrische Warmwasserbereitungsanlagen (74872 B). O. Hasler. Ills. 1200

w. Schweiz Bau—Oct. 21, 1916. Electric heating for domestic purposes as developed in Switzerland.

Presidential Address to the Birmingham Association of Mechanical Engineers (74467 A). R. A. Chattock. (Abstract). 1800 w. Elec'n—Oct. 20, 1916. Economy in supply of power. Suggests transformation of energy in coal into electrical energy.

An Experiment in House-Heating by Electricity (75477). Frederick A. Osborn. Ills. 1500 w. Elec Wld—Dec. 23, 1916. Seven room Seattle dwelling. Cost.

Further Experiments in Electrical Heating (76172). Ills. 2500 w. Ht & Vt Mag—Jan., 1917. Data from light residence installations in Seattle, Washington.

Temporary Electric Heaters (76951). N. L Rea Ills 1200 w. Power—Feb. 27, 1917. How to construct heaters for drying out transformers, generators and other electrical equipment.

Electric Heating and Cooking (78285). 2500 w. Times Eng Supp—March 30, 1917. Apparatus, utilization of energy, efficiencies, etc.

**Hoisting**

Electric Mine Hoisting (78964 A). R. S. Sage. Ills. 5000 w. Gen Elec Rev—June, 1917. Factors which led to the adoption of electricity as the motive power; typical duty cycles; details of equipment, operation, and advantages of three systems named.

Grab Bucket Coal Hoists Operated by Alternating Current Motors with Dynamic Braking and Regenerative Braking (81274 N). James Farrington and R. H. McLain. Ills. 3300 w. Assn I S E E—Sept., 1917. Methods of hoisting by a. c. and places where greater economies can be effected.

**Industrial Power**

Electricity in the Iron and Steel Industry (75045). Ills. 1800 w. Elec Rv & Wes Elec—Dec. 2, 1916. General information on processes and requirements.

See Industrial Management, *Finance and Costs.*

**Irish Industry**

The Production and Distribution of Power and Its Influence on the Development of Irish Industry (80964 A). J. F. Crowley. Read before the Irish Tech. Instruction Cong. 2000 w. Elec'n—Aug. 17, 1917. Serial, 1st part. Power from the point of view of industrial development.

**Lumber Mills**

Electricity in a Large Lumber Mill (77232). Ills. 1200 w. Elec Rv & Wes Elec—March 10, 1917. Selection of motors, types of drive, etc.

**Machine Shops**

Electric Driving in Machine Shops (76377 A). F. Ashton. 2000 w. Mech Wld—Jan. 19, 1917. Serial, 1st part. Advantages and present practice; characteristics of different motors, etc.

Electricity in Machine Tool Operation (76498). Ills. 2500 w. Elec Rv & Wis Elec—Feb. 3, 1917. Advantages, applications, etc.

**Manufacture**

Electrical Manufacture (80739). 900 w. Times Eng Supp—July 27, 1917. Outlook for future prosperity in this line in Great Britain.

**Marble Quarries**

Uses of Electricity in Marble Quarries Prove Highly Advantageous (81507). Ills. 2500 w. Elec Rev & Wes Elec—Sept. 29, 1917. Hydroelectric power applied in Vermont quarries.

**Marine Railway**

The Spring Lake Marine Railway (79690 A). Ills. 1800 w. Gen Elec Rev—July, 1917. A mechanism designed to serve the same purpose as a marine lock.

**Marine Uses**

Uses of Electricity Aboard Ship (79838). Ills. 4000 w. Elec Rev & Wes Elec—July 7, 1917. Reviews principal applications with their advantages.

**Mill Service**

Electric Service in a Cotton Mill (77712). David Elwell. Ills. 3500 w. Elec Wld—March 31, 1917. Considerations which influenced selection of equipment and methods.

**Mines**

Successful Electrical Installations (77892). C. L. Packard. Ills. 2000 w. Cl Age—April 7, 1917. Electrical practice in mines and coal-handling plants.

**Motor Drives**

Individual Motor Drives (75085). R. A. Cultra. 2200 w. Nat Engr—Dec., 1916. Advantages, suggestions.

Motor Drive of Hydraulic-Elevator Pumps (75365). Charles J. Carlsen. Ills. 2500 w. Elec Rv & Wes Elec—Dec. 16, 1916. Use of central station service for operating elevator pumps in Chicago.

Motor Drive in Various Industries (80614). Ills. 7500 w. Elec Rev & Wes Elec—Aug. 18, 1917. Serial, 1st part. Advantages and characteristics.

**Motor Specifications**

Specifications for Motor Applications (77901). A. G. Pogicke. Ills. 2200 w. Power—April 10, 1917. Points to be considered when specifying electric motors for industrial plants.

**Munition Plant**

The Power Problem of the Munition Plant (80922). Sydney Fisher. 3000 w. Elec Wld—Sept. 1, 1917. Necessity of adequate equipment and its reliable operation.

**Nova Scotia**

The Water Powers of Nova Scotia (80772). T. W. J. Lynch. 1200 w. Can Engr—Aug. 23, 1917. Reviews the topographical features of the province with particular reference to the drainage areas.

**Oil Wells**

The Development and Extent of the Operation of Oil Wells by Electric Power (78969 A). W. G. Taylor, with bibliography. Ills. 3000 w. Gen Elec Rev—June, 1917. Reviews the introduction of the electric motor in this field showing how it has gained in favor.

**Paper Mills**

Electric Motor Drive in Paper Mills (76860). Ills. 2200 w. Elec Wld—Feb. 24, 1917. Load conditions and sizes and types of motors.

Electricity in the Pulp and Paper Industry (78497 A). W. W. Cronkhite. Ills. 3000 w. Gen Elec Rev—May, 1917. Machines used; adaptability of the electric motor.

**Pneumatic Tubes**

Electricity in Pneumatic-Tube Mail Service (75189). Ills. 1500 w. Elec Rv & Wes Elec—Dec. 9, 1916. Explanation of system and data on application of electricity.

**Precipitation**

Electrical Precipitation in the Chemical Industries (79012). A. F. Meston. Ills. 3000 w. Elec Jl—June, 1917. How the physicist and electrical engineer can overcome difficulties and improve conditions.

**Pumping Plants**

Electricity in Municipal Pumping Plants (74839). Ills. 2000 w. Elec Rv & Wes Elec—Nov. 25, 1916. Equipment, economy, data sheets.

Het electrisch hoofd-hulpgemaal bij Uitdam (74859 B). W. Lulofs. Ills. 1900 w. Ingr—Oct. 21, 1916. Electric pumping station for regulating the amount of overflow through the dykes in Holland.

Electricity in Irrigation Pumping (76779). Norman G. Meade. Ills. 2000 w. Elec Rv & Wes Elec—Feb. 17, 1917. Data on water requirements and power necessary, with operating results.

Mine Pumps (78967 A). Fred J. Schwarz. Ills. 3500 w. Gen Elec Rev—June, 1917. Methods of getting rid of mine water; characteristics of pumps and interesting installations.

**Rolling Mills**

Electricity in a Steel Rolling Mill (74543). W. L. Berry. Ills. 2000 w. Elec Rv & Wes Elec—Nov. 11, 1916. Details of equipment in plant of St. Louis Screw Co.

Le Halage Funiculaire Electrique Sur les Canaux (74919 B). Ills. 1600 w. La Nat—Nov. 11, 1916. Electric towing systems in use on the Foug Canal.

**Russia**

L'Avenir De L'Électricité En Russie (82081 B). 5500 w. Ind Elec—Oct. 10, 1917. Possibilities of electrical development in Russia. The German peril.

**Shipyards**

Applications of Electricity in the Construction of Steel Ships (79836). Ills. 2500 w. Elec Rev & Wes Elec—July 7, 1917. Résumé of the advantages of motor drive with details of two plants.

Electricity in Shipbuilding Operations (79835). Ills. 5500 w. Elec Rev & Wes Elec—July 7, 1917. Present activities.

Applications of Electricity in the Construction of Wooden Ships (79837). Ills. 2500 w. Elec Rev & Wes Elec—July 7, 1917. Advantages of motor drive.

**Shovels**

Electric Shovels (78966 A). H. W. Rogers. Ills. 2000 w. Gen Elec Rev—June, 1917 Characteristics that have a bearing on the selection of the type of motor.

**Skating Rinks**

Electricity in Ice-Skating Rinks (78614). C. J. Carlsen. Ills. 2500 w. Elec Rev & Wes Elec—May 12, 1917. Details of two large Chicago rinks.

**Smelting**

Electric Iron Smelting (79318 A). J. O. Boving. 3000 w. Ir & Cl Trds Rev—May 25, 1917. Methods and processes.

**Steam Generation**

Dampferzeugung durch Elektrizität mit Wärme-Aufspeicherung (78856 B). E. Höhn. Ills. 2000 w. Schweiz Bau—Apr. 28, 1917. Apparatus for steam generation by electric heating. Results, etc.

**Steel Industry**

Electricity in the Steel Industry (81083). C. D. Kester and W. R. Runner. Ills. 1500 w. Elec Jl—Sept., 1917. The power requirements and the electrification of this industry.

Factors Relating to the Economical Generation and Use of Electric Power in the Steel Industry (81267 N). Brent Wiley. 2500 w. Assn I S E E—Sept., 1917. Factors increasing the demand and the problem of economical power generation.

**Storm Fighting**

Fighting Hail and Storm by "Electric Niagaras" (77645 A). 1500 w. Elec Rev—March 9, 1917. Serial, 1st part. Details of methods used in France.

**Suburban Power**

Electricity for Suburban and Country Institutions (80127). Edmund F. Brigham. Ills. 1800 w. Elec Rev & Wes Elec—July 21, 1917. Possibility of furnishing satisfactory service.

**Tanning**

Power for Tanning (79607). Ills. 1500 w. Prac Eng, Chi—July 1, 1917. Electric energy as a by-product of plant at Waukegan, Ill.

**Thawing**

Thawing Service Connections (78718). Henry B. Machen. Ills. 2500 w. Mun Jl—May 17, 1917. Abstract of paper and discussion before Am. W. Wks. Assn. Electrical thawing in New York and other cities; costs and charges.

**Vacuum Cleaners**

The Vacuum Cleaner Opportunity (77873). Ills. 2000 w. Elec Rv & Wes Elec—April 7, 1917. Possibilities as a central station load builder.

**Washing Machines**

Domestic Engineering as Applied to the Electrically-Operated Washing Machine (79010). V. M. Beeler. Ills. 3500 w. Elec Jl—June, 1917. Details of various types

**Welding**

Arc Welding (76018 A). H. D. McKinney. Ills. 3500 w. Univ Colo Jl Eng—Oct., 1916. Methods described.

The Electric Welding Process (75954 A). From report to Assn. of Ry. Elec. Engrs. 2500 w. Ry Mech Engr—Jan., 1917. Methods and equipment.

Electric Arc Welding (78978 A). H. A. Unland. Ills. 2500 w. Gen Elec Rev June, 1917. Principal factors involved in electric arc welding and cutting.

Soudure Électrique (81402 B). 2400 w. Ind Elec—Aug. 25, 1917. Interesting details concerning electric welding from the bulletin of French munitions works.

See also *Welding*, under MECHANICAL ENGINEERING, *Machine Works and Foundries*.

**Wheel Factory**

Electricity in an Automobile-Wheel Plant (76124). Ills. 1200 w. Elec Rv & Wes Elec—Jan. 20, 1917. Plant at Detroit.

**"White Coal"**

Il Carbone Bianco (76203 B). 1300 w. Ind—Dec. 3, 1916. Serial, 1st part. Present status of electrical development in Italy.

See also MINING AND METALLURGY, *Coal and Coke*.

## TRANSFORMERS

**Autotransformers**

The Use of Autotransformers on Grounded Neutral Systems With Rotary Converters and Motors (74273). W. R. Woodward. 700 W. Elec Jl—Nov., 1916. Points requiring attention.

**Bell Transformers**

Bell Transformers: Design and Tariffs (80097 A). E. Wirz. Ills. 3300 w. Elec'n—July 6, 1917. Details of transformers for operating bells.

Les Transformateurs Pour Sonneries (82080 B). 2000 w. Ind Elec—Oct. 10, 1917. Description, characteristics and efficiency of various types of bell transformers.

**Boosters**

Static Transformers Used as Boosters (80499). F. S. Fletcher. Diagrams. 1200 w. Elec Rev & Wes Elec—Aug. 11, 1917. Precautions to be observed.

**Capacity**

Capacities of Transformers for Induction Motors (80100). G. P. Roux. 2500 w. Power—July 24, 1917. Discusses characteristics, showing how to determine the proper capacity.

**Connections**

Emergency Transformer Connections (78638). G. P. Roux. Diagrams. 1500 w. Power—May 15, 1917. Explains various connections for compensating line voltages.

**Design**

Fundamental Principles of Present-Day Transformer Design (76128). W. M. McConahey and J. F. Peters. Ills. 2500 w. Elec Wld—Jan. 20, 1917. How different arrangements of coils affect the deplacement stresses, etc.

**Economy**

Factors that Determine Economical Life of Transformers (75965). Theodore B. Morgan. 2000 w. Elec Wld—Jan. 13, 1917. Investigations to determine whether it is economical to continue in service long-used transformers.

**Fires**

Fires in Transformers (81134). M. A. Walker. 1500 w. Power—Sept. 18, 1917. Their causes and means of extinguishing considered.

**Frequency Changers**
See same heading under *Generators and Motors.*

**High Frequency**
Some Notes on the Theory of Iron-Cored High-Frequency Current Transformers (75883 A). N. W. McLachlan. 1500 w. Elec'n—Dec. 22, 1916. Results of investigation.

**Induction Coils**
Induction and Repeating Coils (74717). E. W. Kellogg. 3500 w. Telephony—Nov. 18, 1916. Action in capacity of step-up transformers.

**Insulation**
Insulation of High-Voltage Transformers (76782). Alfred Still. 3000 w. Elec Wld—Feb. 17, 1917. Serial, 1st part. First of two articles on fundamental principles underlying all problems of insulation, with data for dimensions.

**Loads**
Systematizing the Changing of Transformers (81299). Ills. 1500 w. Elec Wld—Sept. 22, 1917. How an Ohio company keeps track of the loads on its distribution transformers to prevent overloading.

**Parallel Operation**
The Parallel Operation of Static Transformers (77001 A). J. Lindley Thompson, and S. Austen Stigant. 2000 w. Elec'n—Feb. 9, 1917. Serial, 1st part. Procedure to obtain satisfactory parallel operation.

**Phase Lag**
Phase Lag in Current Transformers (76366 A). P. de la Gorce. Abstract trans. from *Bul. de la Soc. Int. des Elect'ns.* 800 w. Elect'n—Jan. 12, 1917. Tests described.

Phase Lag in Current Transformers (80374 A). A. J. Makower and A. Wust. Ills. 600 w. Elec'n—July 13, 1917. Methods simple to carry out and capable of giving required results.

**Phases**
Phase Rotation (77128). C. J. Fechheimer. Diagrams. 1800 w. Elec Jl—March, 1917. Two, three, and six-phase systems.

**Practice**
The Essentials of Transformer Practice (79787). E. G. Reed. Ills. 2500 w. Elec Jl—July, 1917. The evolution of the transformer.

**Protection**
Protection of Transformer Neutrals Against Destructive Transient Disturbances (76635 D). Max H. Collbohm. 1200 w. A I E E, Pro—Feb., 1917. Shows that protection must be provided.

**Reactor**
Improving a Current Limiting Reactor by D.-C. Excitation of a Pair of Transformers (81554 A). F. Parkman Coffin. Ills. 1200 w. Gen Elec Rev—Oct., 1917. Describes a method of meeting requirements by applying d. c. to a. c. apparatus.

**Rectifiers**
The Tungar Rectifier (77139 A). R. E. Russell. Ills. 3500 w. Gen Elec Rev—March, 1917. The hot cathode argon gas filled rectifiers as at present developed commercially.

**Regulator**
An Instantaneous Voltage Regulator (77542). Charles J. Hejda. Ills. 900 w. Elec Rv & Wes Elec—March 24, 1917. Permits lighting and power loads to be supplied from the same transformer.

**Small Transformers**
Kritische Betrachtungen über Klingeltransformatoren und ihre Tariffrage (76265 B). E. Wirz. Illus. 9600 w. Schweiz Elek Ver Bul—Dec., 1916. Principles of design of small transformers for connection to regular supply circuits.

**Spacing**
Economical Spacing of Transformers (79266). P. O. Reyneau. 2000 w. Elec Wld—June 16, 1917. Relation between transformer size and spacing and wire size.

**Temperature**
Effect of Barometric Pressure on Temperature Rise of Self-Cooled Transformers (75906 A). V. M. Montsinger. Ills. 3500 w. Gen Elec Rev—Jan., 1917. Influence of altitude.

**Toy Transformers**
Safety Requirements of the Toy Transformer (75683). Chester H. Thordarson. 1800 w. Elec Rv & Wes Elec—Dec. 30, 1916. Possible hazards.

**Transformer Cooling**
Outdoor High-Tension Arrangements and Construction (75368). M. M. Samuels. Ills. 2500 w. Elec Wld—Dec. 16, 1916. Transformer cooling problems and their solution.

**Transformers**
Transformers of Large Current Capacities (77782). V. E. Alden. Ills. 2500 w. Elec Jl—April, 1917. Problems in construction to carry loads of this character.

The Importance of the Transformer (81544 A). Ills. 1500 w. Ry & Loc Eng—Oct., 1917. Serial, 1st part. Faraday's experiments which led to the transforming of electrical energy. Types employed.

**Transformer Windings**
Cooling of Oil-Immersed Transformer Windings After Shut-Down (78153 D).

V. M. Montsinger. Ills. 20 pp. A I E E, Pro—April, 1917. Discusses from a theoretical standpoint the cooling of oil-immersed transformer windings after load has been removed. Three methods, their advantages and disadvantages.

See also same heading under STREET AND ELECTRIC RAILWAYS.

## TRANSMISSION AND DISTRIBUTION

**A. C. Distribution**

The Split Conductor Protective System for A. C. Distribution (80497 N). E. B. Wedmore. Ills. 3500 w. Beama Jl—July, 1917. Details of system which seems to meet requirements.

**Aerial Cable**

Overcoming Difficulties With Aerial Cable (78020). E. B. Meyer. Ills. 2500 w. Elec Wld—April 14, 1917. Installed where conditions do not permit the use of open-wire or underground circuits.

**A. I. E. E. Reports**

Annual Reports of Technical Committees of A. I. E. E. (79865 D). 35 pp. A I E E, Pro—July, 1917. Short reports submitted at meeting of June 28, 1917.

**Alternating Currents**

Peligros De Las Corrientes Alternas Industriales (76241 D). H. M. Levylier. Illus. 9500 w. Soc Cien Arg Ann—July-Aug., 1916. Discussion of voltages and frequencies considered dangerous, and means of diminishing risks.

**Balancers**

Balances for Three-Wire Continuous-Current Systems (76367 A). Thomas Carter. 6000 w. Elec'n—Jan. 12, 1917. Serial, 1st part. Notes on the general subject of balancers for such systems.

Direct-Current Balancers (81832 A). 600 w. Elec Rev—Sept. 28, 1917. Explains the balancer principle, illustrating by example.

**Buenos Aires**

Le Installazioni Di Buenos Aires (77573 B). Ills. 1300 w. Ind—Feb. 18, 1917. Distributing system, station, etc., of Compania Italo-Argentina De Electricidad.

**Cable Joints**

The Fundamentals of Successful High-Tension Cable Joints (79373 D). D. W. Roper. 2000 w. A I E E, Pro—June, 1917. Specifications applying in general to joints on cables operating at voltages above 20,000 volts.

**Cables**

The Bonding and Anchoring of Electric Cables (76450 A). Ills. 900 w. Elec Rev—Dec. 8, 1916. Designs and comments.

Cable Junction Boxes (76365 A). Ills. 1500 w. Elec Rev—Jan. 12, 1917. Serial, 1st part. Designs in use.

High - Pressure Cable Joints (77644 A). Ills. 1700 w. Elec Rev—March 9, 1917. Methods of joining conductors.

Modern Power Cables (78199 A). H. Savage. 6000 w. Mech Engr—April 6, 1917. Read before the Assn. of Supervising Electn's. Forms of cables which are considered standards.

Some Notes on Bonding and Earthing the Lead Sheathing of Underground Cables, with Special Reference to Solid Systems (78193 A). 2200 w. Elec Rev—April 6, 1917. Methods and materials commonly used.

Labor Data on Underground Cable Construction (79878). John D. Morgan. 2000 w. Prac Eng, Chi—July 15, 1917. Serial, 1st part. Information valuable in making estimates.

The Paper Insulated Cable for the Transmission of Power (80645 A). Benjamin F. Lee. 2200 w. Sib Jl Eng—Aug., 1917. Care and vigilance required in manufacturing and installing.

Some Practical Experiences with Tough Rubber Compound Cables (81831 A). W. Ellerd-Styles. 1500 w. Elec Rev—Sept. 28, 1917. Experience demonstrating their successful use and justifying their general adoption.

The Protection of Cables Against Electrolysis (81835 A). Abstract trans. from *Ann. des Postes, Télégraphes et Téléphones*. 2000 w. Elec'n—Sept. 14, 1917. Regular inspection essential; proper installation of conduits the best protection.

**California**

Power Carried 548 Miles from Hydro-Electric Station Working on Both 1247- and 1777-Foot Heads (78601). Map & Ills. 1500 w. Eng News-Rec—May 10, 1917. Rush Creek plant draws water from two reservoirs.

**Cantonments**

Typical Work at the Cantonments (80920). Ills. 2500 w. Elec Wld—Sept. 1, 1917. Examples of rapid construction so that electric service shall be ready.

**Centralization**

Power Station Centralization and Inter-Linking (80121 A). John P. C. Kivlen. 6500 w. Ir & Cl Trds Rev—July 6, 1917. Difficulties of inter-connecting.

**Charging Currents**

Transmission-Line Charging Currents (80456). R. H. Marvin. 1500 w. Elec

Wld—Aug. 11, 1917. Serial, 1st part. Method of using capacity and potential coefficients to determine charging currents in three-phase lines.

**Circuit Breakers**

The Application of Oil Circuit Breakers to a Large Power System (74272). J. B. MacNeill. 800 w. Elec Jl—Nov., 1916. Typical illustration of such a problem.

Rating of Oil Circuit Breakers (75411 D). E. M. Hewlett. 1000 w. A I E E, Pro—Dec., 1916. Difficulties encountered, favoring on the basis of the current to be opened in the arc at the operating voltage.

Rupturing Capacities of Oil Circuit Breakers (75409 D). Stephen Q. Hayes. 2200 w. A I E E, Pro—Dec., 1916. Proper basis for the guarantees.

Testing Large Oil Circuit Breakers (75107). J. N. Mahoney. Ills. 1200 w. Elec Jl—Dec., 1916. Types and tests.

**Conductors**

Proper Current Densities (74594 A). B. B. Hood. 600 w. Met & Chem Eng —Nov. 15, 1916. Two charts for determining proper current density and size of conductor.

Graphical Presentation of Conductor Properties (76655). Andres Ham. 1200 w. Elec Wld—Feb. 10, 1917. Chart and outline of method of using it; basis of construction and method of plotting lines.

**Conduits**

Unusual Underground System at Cincinnati (81922). Ills. 700 w. Elec Wld —Oct. 20, 1917. Details of design and construction.

**Connected Stations**

The Parallel Operation of Electric Power Stations (76998 N). 12800 w. Instn E E, Jl—Feb., 1917. Discussion of J. S. Peck's paper.

**Controllers**

Industrial Controllers (75869). H. D. James. 1500 w. Elec Jl—Jan., 1917. Serial, 1st part. Introductory to a series discussing general characteristics and fundamental operating principles.

Automatic Operation of Bell Hoists for Blast Furnaces (81034). E. S. Lammers, Jr. and C. H. Hodgkins. Ills. 1700 w. Elec Jl—Sept., 1917. Requirements and application of industrial controllers.

Magnet-Type Elevator Controller (81338). J. Gintz, Jr. Ills. 2000 w. Power—Sept. 25, 1917. Construction, etc.

**Converters**

Siemens Rotary Converters (80567 A). Ills. 2500 w. Elec'n—Aug. 3, 1917. Serial, 1st part. Types of converting plant; voltage control, etc.

**Current Feeders**

Voltage Regulators for Alternating-Current Feeders (80128). Norman G. Meade. Ills. 3000 w. Elec Rev & Wes Elec—July 21, 1917. Types of feeder regulators and their control.

**D. C. Networks**

Effect of Adding Conductors to D. C. Networks (78174). Merwyne C. Rodi. 3000 w. Elec Wld—April 21, 1917. Simple solution for problem caused by installing a conductor of a given size in a particular position.

**Denver**

Changes That Increase Denver's Electrical Distribution Facilities (75199). D. C. McClure. Ills. 2000 w. Elec Wld—Dec. 9, 1916. New system of distribution; changes outlined.

**Detectors**

Ground Detector Developed by Pacific Coast Company (75200). George E. Armstrong. Ills. 1000 w. Elec Wld—Dec. 9, 1916. Construction and operation of a sensitive 2200-volt ground detector that gives an audible as well as a visible signal.

**Detroit**

The Detroit Edison Distribution System (76111). Map and Ills. 1500 w. Elec Rv & Wes Elec—Jan. 6, 1917. Generating equipment, and feeder, transmission, and distribution systems, with service data.

**Disconnecting Boxes**

Some Notes on Diving-Bell Covers for Disconnecting Boxes (80778 A). G. W. Stubbings. Ills. 1000 w. Elec Rev—Aug. 10, 1917. Dimensions to which such covers must conform to be successful in given conditions.

**Electrical Appliances**

Selling Appliances to Employees (80200). 1700 w. Elec Wld—July 28, 1917. Current practice and policy.

**Electrical Mobilization**

Electrical Mobilization in France (78943). J. Blondin. Ills. 700 w. Elec Rev & Wes Elec—May 26, 1917. Rapid development of hydroelectric projects.

**Engineering Projects**

A Bit of Engineering History (78471). A. M. Gow. 2500 w. Elec Jl—May, 1917. Story of the Fuel Gas & Electrical Engineering Co.

**Evansville, Ind.**

Changing from 2300 to 4000 Volts Without Interruption to Service (81794). Ills. 2200 w. Elec Rev & Wes Elec—Oct. 13, 1917. Feat accomplished in Evansville, Ind.

**Faults**

Induction Methods of Fault Localization (79577 A). H. E. Blake. 700 w. Elec Rev—June 15, 1917. Diagram and apparatus for telephone method explaining the use.

**Feeder Sizes**

Feeder Sizes and Connected Load (76499). Ills. 2500 w. Elec Rv & Wes Elec—Feb. 3, 1917. Data and diagrams of demand factors.

**Formula**

Transmission—Line Formula (79204). E. M. Richards. 700 w. Power—June 12, 1917. Formula for making calculations in design of d. c. systems.

**France**

Hydro-Electric Power and Electrochemistry and Electrometallurgy in France (76988 A). C. O. Mailloux. Map. 9000 w. Met & Chem Eng—March 1, 1917. Serial, 1st part. The evolution of water power, electric transmission, developments, etc., in present number.

**Fuses**

Investigation of Cartridge-Inclosed Fuses (76325 B). Oscillographs. 193 pp. U S Bur Stds, No. 74—Dec. 1, 1916. Further experience is desirable.

**Fusing**

See same heading under *Electro-Physics.*

**High Tension**

Construction and Layout of High-Tension Equipment (74697). M. M. Samuels. Ills. 2500 w. Elec Wld—Nov. 18, 1916. Analysis of improvements in indoor-station apparatus and construction methods. New types of transformers, lightning arresters, switching equipment, etc.

High-Tension Transmission Supply (76435). Ills. 2500 w. Prac Eng, Chi—Feb. 1, 1917. Modern plant at Kincaid, Ill.

Installations De Tableaux (76914 B). 6700 w. Ind Elec—Jan. 10, 1917. French suggestions for the installation of high tension switchboards, transformers, switches, etc.

High-Tension Overhead Transmission Lines (78660 A). G. V. Twiss. 2000 w. Elec'n—April 27, 1917. Serial, 1st part. Design and safety, cost, materials, insulators, etc.

Power Transmission from Windsor (79035). F. H. Bernhard. Ills. 2500 w. Elec Rev & Wes Elec—June 2, 1917. High-tension lines running from Windsor, W Va. Line crossing over Ohio River; Windsor-Canton line.

High-Tension Current in Mines (80599). J. Roland Brown. Read before Ky. Min. Inst. Ills. 3000 w. Cl Age—Aug. 18, 1917. If properly installed they are not dangerous.

Protezione Delle Installazioni Elettriche Contro le Sovratensioni (81409 B). Ills. 1300 w. Mon Tec—Aug. 20, 1917. Methods of protecting electrical apparatus from excessive voltages.

Iron Wire for Short High-Voltage Lines (81297). W. T. Ryan. 2500 w. Elec Rev & Wes Elec—Sept. 22, 1917. Suitability for light loads.

**Insulation**

Electrical Porcelain (78023 A). L. E. Barringer. Ills. 2500 w. Met & Chem Eng—April 15, 1917. Address at Chemists' Club in N. Y. Discusses raw materials and the difficulties and methods of manufacture.

Insulation Characteristics of High-Voltage Cables (79375 D). W. S. Clark and G. B. Shanklin. 47 pp. A I E E, Pro—June, 1917 Detailed discussion of different types of single- and three-conductor cable.

Report of Committee D-9 on Electrical Insulation (79478 N). Ills. 15 pp. Am Soc Test Mat—June, 1917. Proposed tentative tests.

**Insulators**

Converting Pin-Type to Suspension-Type Line (75202). George H. Stockbridge. Ills. 800 w. Elec Wld—Dec. 9, 1916. How insulators were changed without interrupting service.

Ceramics in Relation to the Durability of Porcelain Suspension Insulators (76302 D). Harris J. Ryan, with references and notes. Ills. 15 pp. A I E E, Pro—Jan., 1917. Requirements summarized.

Experiments on Porcelain Suspension Insulator Units (76303 D). J. Cameron Clark. Ills. 13 pp. A I E E, Pro—Jan., 1917. Experiments and conclusions.

Investigation of Suspension Insulator Deterioration (76301 D). J. E. Woodbridge. 1200 w. A I E E, Pro—Jan., 1917. Outline of investigations by H. J. Ryan and J. C. Clark.

Unification Des Isolateurs De Ligne (76207 D). Picou, Bouthillon and others. Illus. 4500 w. Soc Int Elec—Nov., 1916. Standardization suggested.

Expansion Effects as a Cause of Deterioration in Suspension Type Insulators (78786 D). J. A. Brundige. Ills. 3000 w. A I E E, Pro—May, 1917. Reasons for believing that expansion effects are the principal cause.

The Insulator Situation (78787 B). W. D. Peaslee. Ills. 2000 w. A I E E, Pro—May, 1917. Résumé of the present insulator situation.

Present Practice in the Design and Manufacture of High-Tension Insulators (79376 D). A. O. Austin. Ills. 17 pp. A I E E, Pro—June, 1917. Discusses principally cracking and absorption as elements producing depreciation. Recent improvements.

Taking Care of Corner Stresses from Large D. C. Feeders (79209). S. L. Foster. Ills. 2000 w. Elec Ry Jl—June 9, 1917. Insulators of lignum vitae wood and 1⅛-in. cold rolled steel pins solve San Francisco problem in a satisfactory manner.

Testing Insulators to Assure Continuous Service (80926). R. W. Sorensen. Ills. 1200 w. Elec Wld—Sept. 1, 1917. Portable outfit used by Pacific Coast Co.

**Interconnection**

Interconnection a Boon to New England Plants (80925). Ills. 2000 w. Elec Wld—Sept. 1, 1917. Benefits of tie lines.

The Interchange of Power Between the Duquesne Light Company and the West Penn Power Company (81035). E. C. Stone. Map. 2200 w. Elec Jl—Sept., 1917. Advantages from operating thus.

**Interference**

See also Induction, under *Communication.*

**Iron Wire**

Some Difficulties With Iron-Wire Transmission (81775). M. D. Leslie. 1500 w. Elec Wld—Oct. 13, 1917. Experiences with 80 miles of 22,000-volt iron-wire line in Kansas.

**Japan**

Power Supply and Development in Japan and Chosen (77428). Ludwig W. Schmidt. 2500 w. Power—March 20, 1917. Report of electric-power industry.

**Lightning Arresters**

Characteristics of Electrolyte for Lightning Arrester (79009). G. C. Dill. Ills. 2000 w. Elec Jl—June, 1917. Advantages and disadvantages of this type.

Die Neuen Normen von Gebändeblitzschutzvorrichtungen (80050). 3600 w. Schweiz Elek Ver Bul—June, 1917. New standards for lightning arresters, specified by Swiss Assoc. of Electricians.

Discharge Alarms for Lightning Arresters (79691). C. E. Green. Ills. 1800 w. Gen Elec Rev—July, 1917. Types described in detail.

Sphere Gaps for Lightning Arresters (80235 A). V. E. Goodwin. Ills. 1500 w. Gen Elec Rev—Aug., 1917. Details of the application of the sphere gap.

**Line Design**

Transmission Line Design (80494 D). F. K. Kirsten. 53 pp. A I E E, Pro—Aug., 1917. Mathematical analysis of the forces for location of cables.

**Line Regulation**

The Application of Synchronous Condensers for Line Regulation (76402). F. H. Farmer and E. V. Caton. Ills. 4800 w. Elec Jl—Feb., 1917. Particular reference to the recent installation at the terminal station of the city of Winnipeg.

**Lines**

Design of Overhead Power Transmission Lines (76391 A). A. F. W. Richards. Ills. 5500 w. Ir & Cl Trds Rev—Jan. 12, 1917. Legal requirements, conductors, poles, and other details.

Iron-Wire Line Built to Serve Small Communities (76653). M. D. Leslie. Ills. 2000 w. Elec Wld—Feb. 10, 1917. Details of construction and cost of a 30-mile line operated at 22,000 volts.

Design Construction and Tests of an Artificial Power Transmission Line for the Telluride Power Company of Provo, Utah (81234 D). George H. Gray. Ills. 42 pp. A I E E, Pro—Sept., 1917. Details of a line duplicating an actual transmission system.

**Long Distance**

Windsor-Canton Transmission Line (77343). Ills. 2000 w. Prac Eng, Chi—March 15, 1917. Energy developed at mouth of W. Va. mine at 130,000 volts, transmitted nearly 60 miles.

**Mains**

Curiosities of Early Mains Work (81833 A). G. W. Stubbings. 1400 w. Elec Rev—Sept. 28, 1917. Curiosities of early bonding, and of other work.

**Netherlands**

De Electriciteitsvoorziening in Nederland (77563 B). H. A. Van Ijsselsteyn. Ills. 17,000 w. Ingr—Feb. 10, 1917. Electricity supply and distribution to various parts of Holland

**1916**

Results of 1916 Light and Power Operations (77053). 1200 w. Elec Wld—March 3, 1917. Income and output.

**Oil Switches**

Die Untersuchungen an Oelschaltern (82003 B). B. Bauer. Ills. 4700 w. Schweiz Elek Ver Bul—Sept., 1917. Serial, 1st part. A study of the thermodynamic and chemical effects of the act of rupturing a circuit.

**Oscillator**

The Pliotron Oscillator for the Production of Large Currents or High Potential at High Frequencies (80231 A). William C. White. Ills. 1200 w. Gen Elec Rev—Aug., 1917. Details.

**Poles**

Brett Treatment of Wooden Poles (78170). A. B. Campbell. Ills. 2500 w. Elec Rv & Wes Elec—April 21, 1917. Report on the preservative treatment of the butts of poles. Abstracted from Bul. of Iowa State College of Agri. & Mech. Arts.

Preservation of Poles from Decay (77708). Kurt C. Barth. Ills. 3000 w. Telephony—March 31, 1917. Shows preservative treatment is economy.

Inspection of Telephone Poles (78647). H. D. Scribner. Ills. 2500 w. Telephony—May 12, 1917. Methods of determining their condition to support required load.

**Polyphase Power**

Phase Transformation (78490 A). G. Faccioli. 2000 w. Gen Elec Rev—May, 1917. Shows how both voltage and current at quadrature with a single-phase source of supply can be obtained by means of inductance.

**Power Factor**

A Physical Interpretation of Power Factor (74657). Robert C. Disque. 2000 w. Wis Engr—Nov., 1916. Explanation of power factor, basing it primarily on its purely mechanical aspects.

**Pressure Curves**

Pressure Drop Curves for Copper Overhead Lines (81059 N). G. N. Wright. 1000 w. Instn E E, Jl—July, 1917. Curves showing the voltage drop with explanatory note.

**Rectifier**

Quecksilberdampf-Gleichrichter (76935 B). Ills. 1600 w. Schweiz Bau—Jan. 13, 1917. Serial, 1st part. New design of mercury vapor arc rectifier brought out by Brown, Boveri & Co.

**Relays**

Protective Relay Equipment on the System of the Commonwealth Edison Company (77488 D). R. F. Schuchardt. Ills. 12 pp. A I E E, Pro—March, 1917. Details of System of the Commonwealth Edison Co. of Chicago, with special reference to the protective devices.

Relay Practice of Large Systems (77379). 2000 w. Elec Wld—March 17, 1917. Reviews papers and discussion at Chicago meeting of A. I. E. E.

Relays for High-Tension Lines (77487 D). Philip Torchio. Ills. 14 pp. A I E E, Pro—March, 1917. Arrangements considered desirable.

**Remodeled System**

Making System Adequate for Increased Loads (81636). P. O. Reyneau. 2000 w. Elec Wld—Oct. 6, 1917. Principles observed in remodeling a large distribution system.

**Rotary Converters**

British Westinghouse Rotary Converters (74732 A). Ills. 2500 w. Elec'n—Nov. 3, 1916. Descriptive.

The Shunt Phase Converter (74969) W. J. Foster. Ills. 1500 w. Power—Nov. 28, 1916. Construction and operation.

**Rural Extensions**

Iron-Wire Transmission for Rural Extensions (81774). L. P. Perry. 2000 w. Elec Wld—Oct. 13, 1917. Economical pole heights and spans.

**Short Circuits**

Short-Circuit Heating in Power Stations and Transmission Lines (80779 A). Ludwig Binder. Abstract from *Elektro Zeit.* 2200 w. Elec'n—Aug. 10, 1917. Temperature effects are discussed. Short circuit conditions. Precautionary measures. Experience with large power.

The Diary of a Short-Circuit (81675). F. J. Wellhouse. Ills. 2200 w. Power—Oct. 9, 1917. Events that take place in a short-circuit and how they are controlled.

**Sleet**

Prevention of Sleet Trouble on High-Tension Transmission Lines (77214). Ralph L. Thomas. Ills. 3500 w. Elec Wld—March 10, 1917. Tests to determine maximum sag of conductors; procedure to prevent troubles, calculation of strain, etc.

**Substations**

Automatic Substations Permit Large Saving in Des Moines (75935). Ills. 2200 w. Elec Ry Jl—Jan. 13, 1917. Data regarding equipment of automatic substations now being installed on city and interurban lines.

**Surges**

The Protection of Electrical Installations Against Surges (74557 A). 5500 w. Elec'n—Oct. 27, 1916. Nature of surges and protection by design, and by use of protective devices.

**Switches**

The Force of Repulsion in Disconnecting Switches (81934). H. B. Dwight. Ills. 700 w. Elec Rev & Wes Elec—Oct. 20, 1917. Derivation of fairly simple formulæ for calculating the force.

**Switching**

High Tension Switching Equipment (74256 A). J. W. Upp. Ills. 1600 w. Gen Elec Rev—Nov., 1916. Distinguishing voltage values for a. c. and d. c. Adverse conditions met and overcome.

Motor-Operated End-Cell Switch (74970). D. P. Orcutt. Ills. 1500 w. Power—Nov. 28, 1916. Function, construction and operation.

**Three Phase**

Beschouwingen over het berekenen van driephasen-wisselstroomtransmissies (74858 B). C. F. Weiland. Ills. 4500 w. Ingr—Oct. 14, 1916. Mathematical treatment of 3-phase alternating current transmission.

Earths on Three-Phase Systems (81200 N). George Gladman Braid. 8 pp. Instn C E—No. 4162. Aims to show what happens when an earth develops on one phase of a three-phase system.

**Three-Wire**

The Theory of Three-Wire Distribution (74420). Terrell Croft. Ills. 2000 w. Elec Rv & Wes Elec—Nov. 4, 1916. Explanatory and descriptive.

**Transmission Lines**

Révision des prescriptions fédérales (78273 B). A. Pillonel. 11,000 w.

Schweiz Elek Ver Bul—Mar., 1917. Swiss specifications for transmission lines.

Transmission Lines (78009 A). Julian C. Smith. 3000 w. Sib Jl Eng—April, 1917. Outlines three main types and important features of their development.

Small-Town Interconnection That Paid (77847). A. Hardgrave. Ills. 1200 w. Elec Wld—April 7, 1917. How iron-wire transmission lines and inexpensive distribution systems were employed.

Telegraph Poles in New Zealand (77934 N). J. Orchiston. 3000 w. Instn E E, Jl—March, 1917. Experience with modern poles.

Overhead Lines (78875). 1200 w. Times Eng Supp—Apr. 27, 1917. General design, conductors, spans, etc. Abstract of G. V. Twiss' paper before Inst'n Elect. Engrs.

**Transmission Report**

Discussion on "Report of Transmission Committee," Cleveland, Ohio, June 27, 1916 (75410 D). Diagrams. 5000 w. A I E E, Pro—Dec., 1916.

**Underground System**

The Phasing-Out of an Underground System (77217). G. W. Teffeau, Jr. Ills. 1000 w. Elec Wld—March 10, 1917. Methods used to identify conductors, and properly connect cables.

**Utah**

Development of a Great System (77279). John C. Damon. Ills. 3000 w. Utah Soc Engrs—Jan., 1917. Growth and development of the Utah Power & Light Co.

**Voltage**

Induction Voltage Regulators (74972). Ills. 1800 w. Power—Nov. 28, 1916. Methods, with reference to the induction type single-phase, feeder voltage regulator.

Voltage Regulation on Alternating-Current Distribution Systems (79013). I. C. Minick. Ills. 1800 w. Elec Jl—June, 1917. Operation of the induction-type feeder voltage regulator.

**Voltage Regulation**

Regulation with V-Connected Transformers (80602). Leslie F. Curtis. 1000 w. Elec Wld—Aug. 18, 1917. Variation of secondary terminal voltage with various combinations of load impedance and power factor.

**Water Power**

Water Power Development and the Future of Power Transmission (75756). Dr. Louis Bell. Ills. 1200 w. Elec Wld—Jan. 6, 1917. Progress during past year.

**Wayleaves**

Wayleaves (74751 A). 4500 w. Elec Rev—Nov. 10, 1916. Also editorial. Conditions of electricity supply in England, and difficulties in securing rights of way.

Wayleaves (78693 N). C. Vernier. 15 pp. Instn E E—May, 1917. Question of securing right-of-way for electric lines over private land. Economies in capital cost.

**Wiring**

Construction Features in a Large Plant (76360). Ills. 1500 w. Elec Rv & Wes Elec—Jan. 27, 1917. Features of electric light wiring in a Chicago plant.

Should Central Stations Wire Houses? (77544). Earl E. Whitehorne. 2800 w. Elec Wld—March 24, 1917. General discussion of the question through letters from a number of central stations.

Tendencies in the Wiring of Finished Houses (77403). 2500 w. Elec Rv & Wes Elec—March 17, 1917. Methods.

Wiring with Tough Rubber Compound Cables (78656 A). W. Ellerd-Styles. Ills. 2500 w. Elec Rev—Apr. 27, 1917. Experience of the writer in the use of this class of cable.

Co-operation in Modern Home and Apartment-House Wiring Practice (81511). 2500 w. Elec Rev & Wes Elec—Sept. 29, 1917. Serial, 1st part. Committee report at recent Spokane convention of the N-W. Elec. Lgt. & Power Association.

Electric Wiring in Cold Stores (81650 A). Sydney F. Walker. 3000 w. Ice & Refrig—Oct., 1917. Methods of protecting electric conductors; why the insulation gives way; remedies.

**Wiring Fixtures**

Electrical Accessories (82037). 2300 w. Times Eng Supp—Sept. 28, 1917. Common defects in lamp holders, switches, etc.

## MISCELLANY

**Addresses**

Chairmen's Addresses before Local Sections (75629 N). Messrs. Robertson, Nevill, McKenzie, and Stothert. 13 pp. Instn E E, Jl—Dec., 1916. Deals with research; coal supply; organization, war conditions, etc.

**Electrical Burns**

A Case of Severe Third Degree Burns Treated with Ambrine (80891 A). Charles G. McMullen. Ills. 3000 w. Gen Elec Rev—Sept., 1917. Describes new treatment for severe burns.

**Electrical Contractors**

The Ills in the Industry and Their Remedies (81933). William L. Goodwin. Ills. 7000 w. Elec Rev & Wes Elec—Oct. 20, 1917. Adress before Contractors' Convention.

**Electrical Industry**

A Discussion of Present Conditions in the Electrical Industry (75091 A). E. W. Rice, Jr. 2500 w. Gen Elec Rev—Dec., 1916. Address before Assn. of Edison Ill. Cos. Reviews status of the industry, increase in prices of materials, effect of munition contracts, and other considerations.

Some Developments in the Electrical Industry During 1916 (75904 A). John Liston. Ills. 12000 w. Gen Elec Rev—Jan., 1917. Salient features of the more important developments.

**Electrical Mobilization**

Electrical Mobilization in Great Britain (78942). F. T. Bangs. Ills. 4500 w. Elec Rev & Wes Elec—May 26, 1917. How manufacturers and utility companies met the conditions of war.

Electrical Mobilization in Canada (78944). Gordon C. Keith. Ills. 2000 w. Elec Rev & West Elec—May 26, 1917. War activities of electrical men.

**Electric Code**

The Pennsylvania Electric Code (81643 A). John Price Jackson. 29 pp. E Cb Phila, Jl—Oct., 1917. Serial, 1st part. Code adopted by the Industrial Board, Penn. Dept. of Labor & Industry.

**Engineers**

The Engineer and His Industry (77549 A). Fred M. Feiker. 3000 w. Wors Poly Inst. Jl—March. 1917. Reviews development of the electrical industry. and the problems of the future.

**Estimating**

Reckless and Intelligent Estimating (774043. George W. Hill. 1200 w. Elec Rv & Wes Elec—March 17, 1917. Fundamental consideration for an intelligent estimate.

**Kelvin**

Some Aspects of Lord Kelvin's Life and Work (75288 N). Dr. Alexander Russell. Eighth Kelvin lecture. 8500 w. Instn E E, Jl—Nov., 1916. His extraordinary versatility in scientific research, and conception of commercial requirements.

**Progress**

Tendencies of Electrical Development in 1916 (75964). 6000 w. Elec Wld—Jan. 13, 1917. Year's progress. Effect of higher material and labor costs.

Year's Great Progress Shown by Statistics (75757). T. C. Martin. 3500 w. Elec Wld—Jan. 6, 1917. Larger volumes of business in every department of electrical activity. Income and output of the large companies.

Progress in Electrical Engineering (76541 A). Alexander Gray. Paper before Ithaca Branch of Sixma Xi Soc. Ills. 3000 w. Sib Jl Eng—Feb., 1917. Review.

**Standardization**

Standardization Committee's Report and Recommendations (81273 N). 35 pp. Assn I S E E—Sept., 1917. Various standards agreed upon.

**Thomson, Elihu**

An Address by E. W. Rice, Jr., on the Occasion of the Presentation of the John Fritz Medal to Elihu Thomson, December 8, 1916 (75905 A). Photograph. Also editorial. 5000 w. Gen Elec Rev—Jan., 1917. Reviews his work and important inventions.

# INDUSTRIAL MANAGEMENT

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**Ambulance Drivers**

Training American Ambulance Drivers (80992). Ills. 2000 w. Auto—Sept. 6, 1917. Medical and mechanical instruction of the Allentown camp system.

**American Chemists**

Has the American Chemist Made Good? (81239). Charles H. Herty. 1500 w. Mfrs' Rec—Sept. 20, 1917. Outlines recent developments affirming accomplishments.

**Americanization**

Education and Americanization (81441 A). C. R. Dooley. 1200 w. Ind Man—Oct., 1917. Suggestions for industrial education and Americanization of the foreign born.

The Americanization of Workmen Around the Lime Plant (81186 N). Frances Kellor. 13 pp. Natl Lime Mfrs Assn—July, 1917. Outlines important things from the viewpoint of Americanization.

**Accountants**

Training Accountants for Public Service (76165 A). Edward A. Fitzpatrick. 2000 w. Jl Actcy—Jan., 1917. Outlines system for public service.

**Acoustics**

A Plea for Acoustic Engineering (75949 A). Ernest Merritt. 1500 w. Sib Jl Eng—Jan., 1917. Some of the problems needing solution.

**Apprentices**

The Royal Dockyard Schools (75220 A). P. H. S. Kempton. 1800 w. Elec Rev—Dec. 1, 1916. Account of the Admiralty method for the training of apprentices.

The Education of Apprentices Within Works (78211 A). 2500 w. Engng—April 6, 1917. Editorial review of the report of the Departmental Committee on juvenile education in relation to employment, with suggestions.

Workshop Training of Apprentices in The Light of Recent Developments (79941 A). Neil J. Maclean. 3500 w. Engng—June 22, 1917. A system of workshop training which will enable a man to qualify as a skilled workman, a draughtsman, or a junior shop executive.

**Apprenticeship**

L'Apprentissage (76214 C + D). P. Jannetaz. 8000 w. Soc Ing Civ Fr—June 30, 1916. Industrial apprenticeship in France. Influence of war, etc.

L'Apprentissage (76215 C + D). 7200 w. Soc Ing Civ Fr—July 7, 1916. Discussion of Jannetaz's paper by Borderel, Kula, Jully, and others.

L'Apprentissage (76213 C + D). 14,000 w. Soc Ing Civ Fr—July 21, 1916. Further discussion of the question.

Education and Business (76556 A). W. L. Hichens. Also editorial. 5500 w. Engr.—Jan. 19, 1917. Preparation needed for English youths for engineering.

Training Apprentices (76441 A). Ills. 5500 w. Machy—Feb., 1917. The Pratt & Whitney system.

L'Université Du Travail De Charleroi Et Le Problème De L'Apprentissage (77592 B). J. Ioteyko. 5400 w. Rev Gen Sci—Feb. 15, 1917. Technical training and trade apprenticeship at the university of Charleroi, Belgium. Outline of courses of study.

By-Products of an Appreticeship System (80454). John H. Linn. 3000 w. Ry Age—Aug. 10, 1917. Experience on the Atchison, Topeka & Santa Fe.

Le Preapprentissage (80729). M. Bellom. 4000 w. Gen Civ—July 28, 1917. Serial, 1st part. How courses may be arranged so as to be preparatory to industrial apprenticeship.

Boiler Shop Apprenticeship Methods (81818 A). 3000 w. Ry Mech Engr—Oct., 1917. Educational work of the Santa Fe system.

Surmounting Our Shortage of Skilled Labor (82102 A). J. A. De Turk. 3000 w. Ind Man—Nov., 1917. Advantages of a good system for training apprentices.

**Architecture**

Popular Education in Architecture and Landscape Gardening (79088 A). Carl F. Pilat. 3500 w. Arch Rec—June, 1917. Summary of the work of federal and state agencies.

**Australia**

Science and Industry in Australia (76206 A). 900 w. Nature—Dec. 21, 1916. Report of Advisory Council.

**Belgium**

Les Méthods Belges D'Éducation Technique (79403 B). J. Ioteyko. 4400 w. Rev Gen Sci—May 30, 1917. History of technical education in Belgium since 1879.

**Blind**

La Rééducation Des Aveugles (78861 B). L. Fournier. Ills. 6000 w. Gen Civ—May 5, 1917. Machines and devices for educating those blinded in war to accomplish useful tasks.

The Blind Sufferers from the War, and Their Future Employment (79019 A). C. Arthur Pearson. 8000 w. Roy Soc Arts, Jl—May 18, 1917. Interesting account of the work at St. Dunstan's in teaching the blind.

**Character**

Character in the Engineer (82034). 3000 w. Times Eng Supp—Sept. 28, 1917. An outline of an ideal of engineering education. Improved methods suggested.

**Chemical Engineers**

The Training and Work of the Chemical Engineer (77462 N). George Beilby, F. G. Dannon, J. W. Hinchley. 10 pp. Faraday Soc—March 6, 1917. Three short papers contributed to a discussion.

**Chemical Industry**

The Human Side of the Development of Chemical Industry (75955 A). G. W. Thompson. Read before Am. Inst. of Chem. Engrs. 2500 w. Met & Chem Eng—Jan. '5, 1916. Serial, 1st part. Need of popularizing the study of chemistry.

**Chemists**

Position and Prospects of Professional Chemists (78295 A). 2100 w. Nature—Mar. 29, 1917. The work of chemists in war preparations. Lessons from British experience.

The Education of the Chemist (79293 A). James J. Dobbie. 800 w. Elec'n—May 25, 1917. Suggestions for training young chemists.

**Chemistry**

Organization and Development of Chemical Industry and Research (77588 A). 3400 w. Nature—March 8, 1917. Presidential address to So. African Assoc. for Advancement of Science.

Chemistry Coming Into Its Own, But Not Yet Adequately Appreciated (81288). 1200 w. Mfrs' Rec—Sept. 20, 1917. Editorial on the achievements of the chemist.

Chemical Progress in the United States (81240). Ellwood Hendrick. 3000 w. Mfrs' Rec—Sept. 20, 1917. Review of chemical industries and accomplishments.

**Cincinnati University**

Metallurgy and Electrochemistry at the University of Cincinnati (77734 A). Ernest E. Thum and Albert W. Davison. Ills. 3500 w. Met & Chem Eng—April 1, 1917. The work of these departments.

**Colleges**

"What Is a College For?" (74361). Letter fom H. P. Boardman. 2500 w. Eng & Con—Nov. 1, 1916. Reply to an editorial printed Sept. 20, 1916.

**Colliery Managers**

The Higher Training of Colliery Managers (80491 N). G. L. Kerr. 10 pp. Instn Min Engrs, Trans—July, 1917. Need for more completely-equipped managers and provisions of scholarships.

**Commerce**

Commerce in the College Curriculum (82059 A). Morris A. Brisco. 7 pp. Eff Soc Jl—Oct., 1917. Changed conditions making necessary new courses in colleges.

**Coördination**

An Experiment in Coördination of Mathematics With Engineering Subjects (76040 A). R. E. Root. 2200 w. Eng Ed—Dec., 1916. Outlines plan and states advantages.

**Disabled Soldiers**

Provision for Disabled Soldiers (81966 N). 5000 w. U S Dept Labor—Oct., 1917. European experience in returning disabled soldiers to civilian life, and preparation in progress by the U. S.

To Prepare Soldier Cripples for Industry (82047 A). Ills. 1000 w. Iron Age—Oct. 25, 1917. Government plans to reinstate the maimed of war on a self-sustaining basis.

**Dynamics**

Methods of Teaching Dynamics (78390 A). William Kent. 10 pp. Eng Ed—April, 1917. Method for teaching young students.

**Electrical Engineers**

"What Becomes of Your Electrical Engineering Graduates?" (77314 A). D. D. Ewing. 1200 w. Eng Ed—Feb., 1917. Study of occupational distribution.

**Electrical Study**

The Electrical Study Course—Some Mechanical Analogies (75698). Ills. 2500 w. Power—Jan. 2, 1917. Serial, 1st part. Introductory article. Analogies.

**Electricity**

The Electrical Study Course—Elements of Electricity (76954). Ills. 1500 w.

Power—Feb. 27, 1917. Serial, 1st part. First of three lessons on electricity.

**Engineering**

Report of Progress in the Study of Engineering Education (74785 A). C. R. Mann. 6000 w. Eng-Ed—Nov., 1916. Reviews history of American system of education, and considers the professional demand, and work of the schools.

Education in Engineering (75854 A). Dr. D. S. Jacobus. 6500 w. A S M E, Jl—Jan., 1917. Presidential address, 1916. Outlines the general principles.

Proposed Reorganization of Engineering Instruction in the Freshman and Sophomore Years (76041 A). L. E. Akeley. 4500 w. Eng Ed—Dec., 1916. Outlines instruction recommended.

What is Best in Engineering Education? (78392 A). H. H. Higbie. 14 pp. Eng Ed—April, 1917. What may reasonably be expected through a judicious college training.

Subjects Recommended for Inclusion in Civil Engineering Courses to Qualify Graduates to Enter the Field of Highway Engineering (78391 A). Arthur H. Blanchard. 1200 w. Eng Ed—April, 1917. Subjects that should be included in a four years curriculum.

What Can Be Done to Improve Engineering in Our Navy To-day (80107 A). V. N. Bilg. 11 pp. U S Nav Inst, Pro—July, 1917. The problem of personnel.

Congrès Général Du Génie Civil (80019 B). E. Barbet. 2000 w. Gen Civ—June 9, 1917. Proposed congress of engineers.

Some Suggestions for Improvements in the Engineering Profession (79823 A). F. G. Jonah, with discussion. 7500 w. E Cb St L, Jl—May-June, 1917. Considers the usual complaints and their remedy, concluding that improvements must come from within the profession.

Engineering Training and Experience (80601). Richard D. Whitney. 800 w. Elec Wld—Aug. 18, 1917. Analysis of qualifications of 42 candidates considered for electrical engineering position paying $4,000.

**Engineering Education**

The Engineering School and the Engineer (77317 B). F. E. Turneaure. 14 pp. West Soc Engrs, Jl—Jan., 1917. Development of the engineering school

Engineering Failure and Success (75588). 1900 w. Times Eng Supp—Nov. 24, 1916. Optimism and other factors of error. Advice for engineers.

The Education of Engineers (75280 N). Charles Riborg Mann. 6000 w. Col Univ Qly—Dec., 1916. Progress report of Committee of Soc. for Promotion of Engng. Education.

**Engineering English**

Mental Values Derived from Study of English Are the Essentials (81873). Emerson Grant Sutcliffe. 2500 w. Eng News-Rec—Sept. 27, 1917. Discusses the fundamental need.

**Engineers**

A Talk to Young Engineers (75095 A). E. W. Rice, Jr. 2500 w. Gen Elec Rev—Dec., 1916. Abstract of address at Schenectady. Problems to be faced by engineers.

Report of the Committee Appointed by the Council to Consider the Question of the Education of Engineers (76830 N). 2 plates. 13 pp. Manchester Assn Engrs —Sept., 1916. Recommendations regarding studies and shop work.

Abus Du Terme "Ingenieur" (80012 B). 2700 w. Rev Tri Can—June, 1917. Misuse of the term "Engineer." French restrictions on its employment.

General Education for the Engineer (79824 A). Edward E. Wall. 2200 w. E Cb St L, Jl—May-June, 1917. Its value and requirements.

Position of the Engineer in National Affairs (79742). H. W. Buck. Address to A. I. E. E., June 27, 1917. 2000 w. Elec Wld—July 7, 1917. The destiny of the engineer.

Joint Session With Machine Tool Builders (79675 A). 3500 w. A S M E, Jl—July, 1917. Discusses the trend in engineering training.

Engineers Will Be Needed to Reconstruct the World (80579). J. A. L. Waddell. 1300 w. Mfrs' Rec—Aug. 16, 1917. Urging large attendance at technical schools to fill the thinning ranks of engineers.

The Engineer's Destiny (80492 D). H. W. Buck. 1800 w. A I E E, Pro—Aug., 1917. Presidential address.

La Formation De L'Ingenieur Em France Et Aux États Unis (82013 C + D). R. Jarry. 4200 w. Rev Met—May-June, 1917. Comparison of French and American methods of training and education for engineers.

Making an Electric Locomotive Engineer Out of a Steam Locomotive Engineer (80890 A). W. F. Coors. Ills. 4000 w. Gen Elec Rev—Sept., 1917. Experience in the instruction of steam engineers on the C. M. & St. P. Ry.

De Economische Taak van dem Ingenieur na den Oorlog (82012 B). I. P. De Vooys. 8700 w. Ingr—Aug. 18, 1917. The economic task of the engineer in war. Address before the Royal Dutch Society of Engineers. Value of training.

**England**

At Last! (76205 A). 1500 w. Nature—Dec. 14, 1916. Editorial on advances in education and training to be expected from the Lloyd George ministry.

Literature and Science in Education (75881 A). A. C. Benson, with discussion. 10,000 w. Roy Soc Arts, Jl—Dec. 22, 1916. The aims of education.

National Reconstruction (76244 A). 1900 w. Nature—Jan. 11, 1917. Review of opinions on the needs of education in England.

The New Education Bill (82014 A). 1200 w. Nature—Oct. 4, 1917. Action as the result of the awakening of England to the need of a better school system.

**English**

A Laboratory Course in English Composition (77313 A). A. C. F. Baebenroth. 1000 w. Eng Ed—Feb., 1917. As in force in the engineering department of Syracuse University.

Institution Instruction in English (77312 A). Samuel C. Earle. 20 pp. Eng Ed—Feb., 1917. Its importance to engineering students.

**Expert Witness**

The Art of the Expert Witness (76819). 2800 w. Eng News—Feb. 22, 1917. Serial, 1st part. First of two articles on the proper way for an engineer to perfect himself as an expert witness, with particular reference to what he should do when called to the stand.

**Foundry Work**

University Foundry Work (81317). John Grennan. Ills. 1500 w. Brs Wld—Sept., 1917. Details of work at the University of Nebraska.

**Handbooks**

Inventory of Engineering Handbooks (78344). R. Fleming. 1500 w. Eng News Rec—April 19, 1917. 1844 to 1916.

**Illiteracy**

The Illiterate Worker in War Time (80560). Winthrop Talbot. 1500 w. Iron Age—Aug. 16, 1917. Bad results due to ignorance. Suggestions for teaching English.

**Illuminating Engineering**

The Educational Aspects of Illuminating Engineering (74800 C). F. K. Richtmyer, with discussion. 30 pp. Ill Eng Soc—Nov. 20, 1916. Development of the technology of illumination, and educating the public to the importance of good lighting.

**India**

State Engineers in India (77581). 1500 w. Times Eng Supp—Feb. 28, 1917. Abstract of report on employment and promotion of native engineers.

**Industrial Work**

Science and Industry (74754 A). J. Swinburne. Lecture at King's College. 5800 w. Elec'n—Nov. 10, 1916. How can universities best fit students to make their living by science in industry.

**Industries**

The Training of Our Industrial Forces (81066). H. F. L. Orcutt. 3000 w. Engng—Aug. 24, 1917. Serial, 1st part. Considers after war conditions, and the training greatly needed by British industry to meet the problems.

**Industry**

Industry and Education (78047 A). S. C. Laws. Abstract of address before the Wigan Educational Society. 3000 w. Colly Gdn—March 23, 1917. Industrial education in Germany and in England.

Under New Management—Science and the Humanities (82093 A). Charles M. Horton. 4500 w. Ind Man—Nov., 1917. Plea for the utilization of scientific discoveries for the betterment of mankind.

**Instruction Methods**

Training in Thought Is the Aim of Elementary English Course as Taught at M. I. T. (76864). Frank Aydelotte. 2500 w. Eng Rec—Feb. 24, 1917. Weight is given to the relation between literature and engineering.

**International Work**

Competitive Education Between Nations (82048 A). Paul Kreuzpointner. 1500 w. Iron Age—Oct. 25, 1917. Other countries more alert. Methods of foreign schools.

**Inventing**

Inventing an Inventor or Creating a Composite Genius (75036). Halbert P. Gillette. Ills. 1200 w. Eng & Con—Nov. 29, 1916. Value of co-operation.

**Italy**

Italy's Industrial Effort and Its Significance (82089 A). Lewis R. Freeman. 4000 w. Ind Man—Nov., 1917. General survey of what Italy has accomplished in producing war material.

**Journalism**

How Technical Journalism Is Taught in a Co-operative Engineering School (76863). C. W. Park. 2800 w. Eng Rec—Feb. 24, 1917. Critical reading of technical journals.

**Juvenile Education**

Bedrock of Educational Progress (78857 A). 1300 w. Nature—April 12, 1917. Report of British committee on Juvenile Education and Employment after the war.

**Laboratories**

Les Laboratoires Nationaux Et L'Industrie (77608 B). L. De Launey. 1000 w. La Nat—March 10, 1917. Work of various countries in the creation of great laboratories to coöperate with industry.

Design of Small Electrical Engineering Laboratories (74727 N). W. Wilson. Ills. 2000 w. Comwh Engr—Oct. 2, 1916. A small plant for practical work.

Independent Laboratories in the Engineering Industries (76682 B). Clayton H. Sharp. 2500 w. Fkn Inst, Jl—Feb., 1917. Advantages and disadvantages.

Les Travaux Et La Rôle Scientifique Du Laboratoire Central D'Électricité (76911 D). P. Janet. 10,000 w. Soc Int Elec—Dec. 7, 1916. Need and possibilities of a central International laboratory.

Les Laboratoires Nationaux De Recherche Scientifique (78256 C + D). H. Le Chatelier. 4500 w. Rev Met—Nov.-Dec., 1916. Report of a special commission on a French National Laboratory.

Per I Laboratori Scientifici (78263 B). 3300 w. Ind—Feb. 25, 1917. Suggestions of Italian scientific and technical committee on a national laboratory.

Independent Laboratories in the Engineering Industries (80528 A). Clayton H. Sharp. 3000 w. Met & Chem Eng—Aug. 15, 1917. Aims and advantages of industrial research.

Le Bureau International Des Poids Et Mesures (80749 B). C. E. Guillaume. Ills. 3200 w. La Nat—Aug. 11, 1917. Equipment and work of the International Bureau of Weights and Measures, Paris.

**Logic**

Some Principles of Logic for Engineers. I. Energy and Cause—Effect (76455). Halbert P. Gillette, with short editorial. 3000 w. Eng & Con—Jan. 31, 1917. Serial, 1st part. Results of study.

**Managers**

The Higher Training of Colliery Managers (79651 A). G. L. Kerr. From a paper before the Min. Inst. of Scotland. 3500 w. Colly Gdn—June 15, 1917. Problems that must be faced and need of trained men.

**Manufacturers**

Les Efforts De L'Industrie Française Pendant La Guerre (82027 C + D). L. Lindet. Ills. 18,000 w. Soc Enc Ind Nat—July-Aug., 1917. Progress of French industry during the war. How manufacturers have coöperated.

**Mathematics**

The Engineer and Mathematics (76728 A). Otto B. Goldman. 2500 w. Ore Soc Engrs—Jan., 1917. Importance of mathematics to engineering.

**Methods**

On the Natural Method of Learning (74786). Sanford A. Moss. 2000 w. Eng-Ed—Nov., 1916. Urges the use of a principle be put first, and the development afterward.

**Military Training**

Engineering Instruction Now Being Given by the First Corps Cadets, and the Formation of a New Engineer Regiment (79369 B). John F. Osborn. 1800 w. Bos Soc C E—June, 1917. The starting of a new engineer regiment is explained.

The Reserve Officers' Training Corps in the Land Grant Colleges (79341 B). Robbert R. Welshimer. 38 pp. U S Art, Jl—May-June, 1917. Possible results.

**Mining**

Education, Efficiency and Economy, with Special Reference to Mining (78388 A). Lancaster D. Burling. 4000 w. Sci M—May, 1917. Reforms needed, and methods suggested.

**Motion Pictures**

Le Cinéma A L'École (75602 B). G. Lanorville. 2000 w. La Nat—Nov. 25, 1916. Use of motion pictures for class room instruction.

**Motor Drivers**

Motor Drivers in the Making (80621 A). Ills. 1300 w. Autocar—Aug. 4, 1917. Methods of instructing pupils.

**Museums**

The Development of Museums and Their Relation to Education (80239 A). Harlan I. Smith. Ills. 5500 w. Sci M—Aug., 1917. The functions of museums, kinds, etc.

**National Development**

The Relation of Engineering Education to National Development (75753). A. E. Kennelly. 900 w. Elec Wld—Jan. 6, 1917. Educational needs of vocational schools.

**Nautical Schools**

Training Boys for Future Officers (78938 A). E. C. Kreutzberg. Ills. 1800 w. Mar Rev—June, 1917. Nautical schools of New York and Massachusetts

**Optical Institute**

Projet D'Un Institut D'Optique Appliquée (78305 B). 1400 w. La Nat—Apr. 14, 1917. Proposed Institute for optical research in France.

**Optics**

National Instruction in Technical Optics (77561 A). 1500 w. Nature—Mar. 1, 1917. Report of a British committee on the necessity for wider teaching of optics.

**Physical Education**

Physical Education Standards (79092 A). Percy R. Carpenter. 2000 w. Worc Poly Inst, Jl—May, 1917. Standards by which physical work is judged and some results attained.

**Physicists and Engineers**

The Relation between Physicists and Engineers (79797 A). Edgar Buckingham, with discussions. 5000 w. Sib Jl Eng—July, 1917. Critical discussion of the lack of interest and appreciation.

National Physical Laboratory (80044). 2600 w. Times Eng Supp—June 29, 1917. Valuable researches made at this English laboratory during the past year.

The Engineer and the Physicist (80644 A). F. K. Richtmyer. 3500 w. Sib Jl Eng—Aug., 1917. Discussion called forth by Dr. Buckingham's article in the July issue.

**Physics**

Modern Physics (81233 D). R. A. Millikan. 18 pp. A I E E, Pro—Sept., 1917. An interesting review of progress, especially the ten most important discoveries of the last twenty years.

**Preparedness**

Preparedness of the Individual (79185 A). A. M. Shaw, with discussion. 80 pp. La Eng Soc, Pro—June, 1917. Ways of giving efficient service to the government in war times.

Educational Preparedness For Peace (79849 A). Joseph Alexander Leighton. 17 pp. Sci M—July, 1917. Need of teaching citizenship. Training in public ethics.

**Prize Papers**

Junior and Student Prize Papers (77764 A). Ills. 5500 w. A S M E, Jl —April, 1917. Abstracts of papers by Howard E. Stevens, Boynton M. Green, and M. Adam, awarded student prizes.

**Publications**

L'Information Et La Documentation Au Service De L'Industrie (80719 C & D). P. Otlet. 15,000 w. Soc Enc Ind Nat—May-June, 1917. A suggested plan for keeping and rendering available to industrial use all technical and scientific publications.

**Railway Clubs**

Railway Clubs and Their Facilities for the Development of Young Men (74610 A). G. M. Basford, with discussion. 26 pp. Ry Cb, Pitts, Pro—Sept. 22, 1916. Improvements in locomotive design.

**Railway Engineers**

The Career by the Engineer's Department of a British Railway (80787 A). 2500 w. Engr—Aug. 10, 1917. Points covering the position and training of railway engineers.

**Re-education**

L'Utilisation des Ouvriers Blessés ou Réformés (76262 C + D). Duperrier. 1700 w. Pont Chaus Ann—July-Aug., 1916. Methods of training disabled or deformed men to fit them for work in France.

**Research**

Engineering Research (74889). 2000 w. Times Eng Supp—Oct. 27, 1916. Projected activities, as abstracted from the Privy Council Report.

Scientific Research and Our Future Sources of Energy (74755 A). D. Robertson. Abstract of address before W. Local Sec. of Inst. of Elec. Engrs. 2200 w. Elec'n—Nov. 10, 1916. The research worker's needs and problems.

Les Laboratories Nationaux de recherche scientifique (75570 B). 3500 w. Gen Civ—Nov. 25, 1916. Report of French Committee on Co-operation of Science and Industry.

Scientific Research in Relation to the Industries (75339 B). Charles P. Steinmetz. 2200 w. Fkn Inst, Jl—Dec., 1916. Industrial and educational research, the difference, limitations, &c.

Scientific Research at the Universities (75900 A). 2200 w. Engr—Dec. 22, 1916. Work at the English universities.

The Great Need of Promoting Research in America (75750). W. R. Whitney. 2500 w. Elec Wld—Jan. 6, 1917. The importance of research.

Industrial Research (76697 A). A. P. M. Fleming. Abstract of paper before the Jun. Inst. of Engrs. 2200 w. Mech Engr—Jan. 26, 1917. Needs in the organization of British industrial research.

Research (76406 A). W. R. Whitney. 7000 w. Gen Elec Rev—Feb.. 1917. Plea for better recognition of the value of scientific research work.

The National Value of Scientific Research (76574 A). George E. Hale. Address at opening exercises of Mass. Inst. of Tech., Oct., 1916. 6000 w. Tech Rev —Nov., 1916. How to aid in preserving peace and reducing sufferings of war.

Chemical Research in Philadelphia (77203 A). Dr. Edgar Fohs Smith. 6500 w. E Cb Phila, Pro—March, 1917. Interesting review since the beginning of 19th century.

Organization for Industrial Research (77241 A). 3000 w. Eng Rv—Feb. 15, 1917. Leading points in an address by J. C. McLennan, before Roy. Can. Inst.

Some Aspects of Industrial Research with Special Reference to American Research Activities (77239 A). A. P. M. Fleming. Abstract of lecture before Manchester Loc. Sec. of I. E. E. 2000 w. Elec'n—Feb. 23, 1917. Value of research to manufacturers, workers, educators, and the recent activities in the United States.

Experiment and Work of an Industrial Research Laboratory (78890 A). Edwin A. Hunger. Ills. 2500 w. Ind Man—June, 1917. Organization and equipment of the Eastman Kodak laboratory. Work accomplished.

Independent Laboratories in the Engineering Industries (78891 A). Clayton H. Sharp. 3000 w. Ind Man—June, 1917. Activities of such establishments. Their function as an aid to various kinds of manufacture.

The Coördination of Teaching and Research (78393 A). W. H. Rayner. 1800 w. Eng Ed—April, 1917. Their relative merits and importance.

The Relation of Research to Everyday Life (78423 A). J. B. Weems. 2800 w. Met & Chem Eng—May 1, 1917. Address before the Virginia Chemists' Club.

Research as a Profession (80183 A). P. G. Nutting. 3500 w. Worc Poly Inst, Jl—July, 1917. Address at meeting of the W. P. I. engineering societies. The function, increase, and application of organized knowledge.

Engineering Research (80811 A). Editorial. 1200 w. Ind. Man—Sept., 1917. Necessity of rendering resources of engineering laboratories available to industry.

Industrial Research (80553 A). Herbert W. Rowell. Abstracts of two papers and discussion. 3500 w. Elec'n—July 27, 1917. Principles, organization, cooperation, etc.

Report of the Committee of Council for Scientific and Industrial Research (81348 A). 4500 w. Colly Gdn—Sept. 7, 1917. Extracts from second annual report issued by the new Research Department, dealing with fuel, peat, domestic heating, etc.

Industrial Research (81413). 2000 w. Times Eng Supp—Aug. 31, 1917. Second annual report of British Privy Council Committee for Scientific and Industrial Research.

L'Indirizzo Sperimentale Ed Il Senso Costruttivo Negli Studi D'Ingegneria (81408 B). M. Dornig. 6000 w. Mon Tec—Aug. 20, 1917. Value of experimental methods in the study of engineering.

Le Mouvement Scientifique (81397 B). G. T. D'Eu. 5800 w. Rev Tri Can—Aug., 1917. Recent accomplishments and results of engineering research.

The Committee for Scientific and Industrial Research (81095 A). 3000 w. Engr—Aug. 31, 1917. Serial, 1st part. Extracts from Report of the Committee of the Privy Council, for year ending July 31, 1917.

Industrial Research and Its Relation to University and Governmental Research (81559 D). C. E. Skinner. 11 pp. A I E E, Pro—Oct., 1917. States the function of each and the desirability of cooperation among all agencies in research.

Industrial Research and the Colleges (81558 D). A. E. Kennelly. 2200 w. A I E E, Pro—Oct., 1917. Outlines the relationship desirable between the pure science college, the technical college, and the industries.

**Reserve Corps**

The Engineer Reserve Corps (78743 A). William N. Carey. 2000 w. Af Eng Soc of Minn, Bul—May, 1917. Extracts from various War Department publications.

**School Buildings**

Technical School Buildings: Their Accommodation and Equipment (78040 A). Ills. 2500 w. Surv'r—March 23, 1917. Board of Education memorandum dealing with the accommodation and equipment of class-rooms, laboratories, and workshops.

The George Peabody College for Teachers, Nashville, Tenn. (79087 A). John Taylor Boyd, Jr. Ills. 20 pp. Arch Rec June, 1917. Details of design of a group of college buildings.

**Schools**

The School of Practical Arts (75281 N). M. A. Bigelow. 1500 w. Col Univ Qly—Dec., 1916. The work of the school.

Comparison of German and American Schools (81951 A). George R. Wells. 3500 w. La Eng Soc, Pro—Oct., 1917. Reprint from *N. Y. Times Mag.* A critical review and comparison.

**Science and Industry**

Comitato Nazionale Scientifico-Tecnico (75553 B). 1500 w. Serial, 1st part. Ind—Nov. 5, 1916. Italian National Committee for co-operation of science and industry.

Du rôle de la Science dans le développement économique du pays (75608 C + D). H. Le Chatelier. 1300 w. Rev Met—May-June, 1916. Application of scientific research to industry in France.

What Industry Owes to Science (75400 A). 3000 w. Engr—Dec. 1, 1916. Serial, 1st part. Shows, by examples, the developments due to scientific thought and method.

Science and Industry—The Place of Cambridge in Any Scheme For Their Combination (79736 A). Richard Glazebrook. The Rede lecture. 7000 w. Engr—June 15, 1917. The various methods in which science has aided the war, and its importance in industry.

La Quadruple Entente Scientifique (80006 B). E. Gley. 6100 w. Rev Gen

Sci—June 15, 1917. Review of the possibilities of research work in various European laboratories.

**Shop Training**

Shop Training for Machine Tool Salesmen (77057 A). Alfred A. Berkwitz. 1400 w. Machy—March, 1917. Methods of giving salesmen a knowledge of their products.

**Signal Corps**

With Signal Officers in Training (81485). E. O. Baker. Ills. 900 w. Telephony—Sept. 29, 1917. Course of instruction for telephone men at Ft. Leavenworth, Kan., to prepare them for commands in U. S. Signal Corps.

**Signalmen**

Two Courses of Training for Signalmen (75207). U. S. & S. Apprenticeship Course. J. E. Saunders. Signal Instruction on the Pennsylvania. J. E. Foster. Ills. 2500 w. Ry Sig Engr—Dec., 1916. Considers successful methods.

**Social Progress**

Our Educational System in Relation to Social Progress (75310 N). C. V. Corless. 16 pp. Can Min Inst, Bul—Dec., 1916. Causes of social unrest, difficulties and means of solving the problem.

**Social Training**

A Plea for Definite Training for Social Responsibility, by Means of Our Educational Institutions (78103). C. V. Corless. 5000 w. Can Min Inst, Bul—April, 1917. Suggested educational reform.

**Statistics**

The Use and Abuse of Statistics, and Pictures with Punch (76734 A). E. P. Roberts. 31 pp. Cleve Eng Soc, Jl—Jan., 1917. Value of graphical presentations.

**Steel Mills**

Training Course of the American Steel & Wire Company (81516 A). Charles R. Sturdevant. 1500 w. Met & Chem Eng—Oct. 1, 1917. Details of successful methods adopted.

**Surveying**

Tulane University Camp of Survey Practice (81952 A). Donald Derickson. Ills. 1200 w. La Eng Soc, Pro—Oct., 1917. Details of the work.

**Technical Education**

Character and Fitness in Education (81185 B). L. S. Randolph. 3500 w. Stev Indic—July, 1917. Importance of studying the mental characteristics of students to determine their line of work.

L'Enseignment Technique Supérieur (77587 C + D). 11000 w. Soc Ing Civ Fr—Jan. 26, 1917. Discussion of L. Guillet's paper on higher technical education in France.

Dell' Insegnamento Tecnico Industriale Superiore (78270 B). R. Falco. 3600 w. Ind—Mar. 11, 1917. Opinions of Italian engineers on higher technical education.

Technical Education (78194 A). F. M. Denton. 4000 w. Elec'n—April 6, 1917. Outlines the proposals for improvement in England, offering suggestions.

Educational (78462 A). J. W. Ledoux. Ills. 22 pp. Engrs Cb Phila, Pro—May, 1917. Symposium of articles on educational institutions in Philadelphia and vicinity which give technical training.

Opera Del Comitato Scientifico-Tecnico (78852 B). G. Colombo. 4200 w. Ind—Apr. 15, 1917. Work of the National Italian Committee on Science and Industry.

Sezione Industriale Del R. Istituto Tecnico Di Torino (79402 B). Ills. 3300 w. Ind—May 27, 1917. Workshops in mechanical engineering department of the Royal Technical Institute, Turin.

**Technical Training**

L'Enseignment Technique Et Professionnel (76945 B). G. Charpy. 3300 w. La Nat—Jan. 20, 1917. Review of present status of technical and vocational training in France.

Education and Technical Training (74470 A). A. P. Trotter. 3500 w. Elec'n—Oct. 20, 1916. Abstract of Presidential Address to the Assn. of Supervising Elect'ns.

Engineers and Chemists (74890). 1400 w. Times Eng Supp—Oct. 27, 1916. Suggested training for engineers.

L'Insegnamento Tecnico E L'Economia Nazionale (74877 B). M. Dornig. 4000 w. Mon Tec—Oct. 10, 1916. Suggestions for technical and business training.

Co-ordinating Technical and Business Training (74954 A). Nicholas Thiel Ficker. 2500 w. Ind Man—Dec., 1916. Essentials of training for young engineers.

The Training of Engineers (74894). 1200 w. Times Eng Supp—Oct. 27, 1916. An appeal for extended apprenticeship in technical industries.

The Training of Young Men for Positions of Responsibility (74648 A). F. W. Thomas, with discussion. 32 pp. N Y Ry Cb Pro—Oct. 20, 1916. System of the Santa Fe Ry.

L'Enseignment Technique Industriel Dans La Province De Québec (75573 B). J. A. Buteau. 5400 w. Rev Tri Can—Nov., 1916. How technical education in Quebec should be improved.

L'Enseignment Technique Supérieur (75565 B). 3200 w. Gen Civ—Nov. 18, 1916. Higher technical education in various countries.

L'Etat Actual De L'Enseignment Technique Supérieur Dans Les Divers Pays (75591 N). L. Guillet. 4500 w. Soc Ing Civ Fr—Nov. 3, 1916. Review of technical education in France.

Nuovi orrizonti per gli insegnamenti professionali (75598 B). E. Cesari. 6000 w. Mon Tec—Nov. 10, 1916. Suggestions for improvement of technical instruction.

L'Industrializzazione Di Roma E Gli Insegnamenti Profesionale E Tecnico (82004 C). 2100 w. Ingeg Ferro—Aug. 31, 1917. Industrial development of Rome and the need of technical education.

**Trade**

British Government Fosters Application of Scientific Research to Industrial Problems (75059). 2000 w. Eng Rec—Dec. 2, 1916. Advisory Council reports activity of past year.

**Trained Men**

The Engineer in Railroad Service (77371). 7000 w. Ry Age Gaz—March 16, 1917. Seven discussions of the scarcity of technically trained men.

**Training**

Train Your Men for Steady Jobs (74956 A). Benjamin A. Franklin. 3500 w. Ind Man—Dec., 1916. The institutional idea for labor. Reasons why it should be incorporated in any industry.

Some Notes on British and Continental Engineering Methods and Training (81168 A). A. G. Ellis. Abstract of lecture before British Westinghouse engineers. 3800 w. Elec Rev—Aug. 31, 1917. Comparison of British and Continental practice.

The Training of the Future Citizen and Worker (80977 A). 1600 w. Engng—Aug. 17, 1917. Editorial on proposals for improvement of education as outlined by Mr. Fisher in the Education Bill introduced in the British House of Commons.

**Universities**

Correlation of University Instruction (77311 A). C. Francis Harding. 2500 w. Eng Ed—Feb., 1917. Discussion of present methods and suggested improvements.

**University Men**

The University Man as an Industrial Asset (78326 A). Dwight T. Farnham. 4000 w. Ind Man—May, 1917. Their fitness for industrial pursuits.

**Unskilled Labor**

Instructions for Unskilled Labor (79560 A). J. A. De Turk and G. H. Radebaugh. Ills. 3500 w. Ind Man—July, 1917. Describes a system for instructing employees in machine work by cards and diagrams.

**Vocational Training**

Broader Scope for Vocational Training (81074 A). Paul Kreuzpointner. 1500 w. Iron Age—Sept. 13, 1917. Efforts to raise the standard of vocational education.

**Warfare**

Applications of Science to Warfare in France (81530 A). George K. Burgess. 2500 w. Sci M—Oct., 1917. Discusses the component parts of the organization for scientific warfare.

**War Training**

Civilian Engineers Instruct "Rookies" at Citizens' Training Camps (77850). J. W. Swaren. Ills. 1800 w. Eng News-Rec—April 5, 1917. Methods of training.

**Women**

The Training of Educated Women for Secretarial and Commercial Work, and Their Permanent Employment (77666 A). Constance Hoster, with discussion. 6000 w. Roy Soc Arts, Jl—Feb. 23, 1917. Urges high ideals of efficiency and training to secure results.

## FINANCE AND COSTS

**Accountants**

Qualifications and Responsibilities of Public Accountants (75309 A). J. E. Masters. 4000 w. Jl Actcy—Dec., 1916. Address at opening of the Worcester School of Accountancy.

**Accounting**

Logic of Municipal Fund Accounts (74655 A). B. F. Butterfield. 2000 w. Jl Actcy—Nov., 1916. Aims to unite, under scientific principles, the appropriation accounts of cities and the accounts of commercial organizations.

Salmon Industry Accounting (74654 A). E. J. Miner. 3300 w. Jl Actcy—Nov., 1916. Methods of a company operating three canneries.

An Accounting System for Coal Mines (75311 N). R. J. Maxwell. 28 pp. Can Min Inst, Bul—Dec., 1916. Outlines a system.

An Accounting System for Township and District Road Officials (75040). 700 w. Eng & Con—Nov. 29, 1916. System prepared by J. M. McCoy, of Illinois Highway Commission.

Chinese Government Railways' Accounts (75126 A). 2500 w. Ry Gaz—Nov. 17, 1916. Reviews the new classification of accounts.

Suggestions for Improving the System of Station Accounts, With Special Reference to Their Check in Audit Offices (76138 A). A. P. Webb. 4500 w. Ry Gaz—Jan. 5, 1917. Prize essay selected for publication by the Indian Ry. Conf. Assn.

The Constructive Movement for Scientific Cost Accounting (75752). Edward N. Hurley. 1200 w. Elec Wld—Jan. 6, 1917. The work of the Federal Trade Commission.

Theory of the Double-Entry System (76163 A). W. A. Paton. 5800 w. Jl Actcy—Jan., 1917. Explanation.

Tanning Industry Accounting (76164 A). C. B. Holloway. 1700 w. Jl Actcy—Jan., 1917. Discussion confined to the production of sole leather.

Must Keep Close Tab on the Business (76857). George W. Hill. 3000 w. Elec Rv & Wes Elec—Feb. 24, 1917. Details of a comprehensive accounting system.

Railway Accounting (76888 A). Frank Nay, with discussion. 25 pp. West Ry Cb, Pro—Jan. 15, 1917. Problems of Federal requirements and their application.

Cost Accounting for the Contractor (77450 A). Leslie H. Allen. 3000 w. Jl Actcy—March, 1917. Outlines chief features of a system, and the use that should be made of cost data.

Essential Factors in Foundry Cost Accounting (77088). Clinton H. Scovell. 3500 w. Fndry—March, 1917. Importance of a knowledge of the cost of different costing operations.

Report of Committee XI—On Records and Accounts (77299 C). 63 pp. A R E A—Feb., 1917.

I. Some Advantages of a Classified Cash-Book. Albert L. Sawyer. II. Watre-Works Accounting. Edwin L. Pride (77973 D). 6500 w. Two papers with discussion. N E W-Wks Assn, Jl—March, 1917. The accounting of water department companies.

The Place Which Accounting Should Occupy in Any Scheme of National Preparedness (78066 N). John Raymond Wildman. 2000 w. Am Ec Rev—March, 1917 (Sup). Relation and advantages.

Electric Utilities Accounting (78760 A). W. A. Clader. 11 pp. Jl Actcy—May, 1917. Read at tri-state meeting of accountants, Wilmington, Del.

Mechanical Aid in Accounting (78360). A. G. Schwenke. Ills. 2500 w. Elec Ry Jl—April 28, 1917. Abstract of paper read before Am. Elec. Ry. Assn. in Milwaukee. The machines and how operated.

Uniform Accounting (79115 A). Reprinted from *Federal Reserve Bul.* April, 1917. 33 pp. Jl Actcy—June, 1917. Proposal for a uniform system to be adopted by manufacturing and merchandising concerns.

Clearing House For Inter-Railway Accounts (79623). T. H. B. McKnight. 4000 w. Ry Age Gaz—June 29, 1917. The advantages of the plan.

Construction Records and Accounts (79853 A). H. C. Hopson. 18 pp. Jl Actcy—July, 1917. Fundamentals, practical application, elements of cost, methods, etc.

Navy Yard Cost Accounting (79852 A). William Mills Corliss. 1500 w. Jl Actcy—July, 1917. Cost system of one of the largest navy yards in the United States described.

Power Accounting (80123 N). W. O. Oschmann, with discussion. 33 pp. Ir & St E E, Assn—May, 1917. Need of a standard method.

Power Plant Accounting (79653). W. A. Taller. 3000 w. Nat'l Engr—July, 1917. Keeping of two accounts. Details explained.

Promoting Accounting Efficiency (80473). E. C. Constans. 2200 w. Telephony—Aug. 11, 1917. Suggestions for eliminating unnecessary routine to allow time for cost accounting.

A Simple System of Foundry Accounting (81287 A). Rodney Derby. 1200 w. Iron Age—Sept. 20, 1917. Continuous record of progress of orders.

Cost Accounting for Mine Engineers (81011). H. H. Stoek. 2500 w. Cl Age—Sept. 8, 1917. From the point of view of an engineer.

Cost-Accounting Methods for Dealers (81017). Ralph H. Butz. 1500 w. Elec Rev & Wes Elec—Sept. 8, 1917. Importance of an efficient accounting system.

Modern Accounting Methods (81007). Arthur E. Anderson. 4000 w. Telephony—Sept. 8, 1917. Importance of proper accounting.

Simple Cost Accounting System Adaptable to Many Classes of Construction (81277). B. R. Leed. 800 w. Eng & Con—Sept. 19, 1917. System devised by the writer and in use on many contracts.

Accounting for Receiverships (81579 A). Herbert C. Freeman. 22 pp. Jl Actcy—Oct., 1917. Address before the Am. Inst. of Accountants. Outlines the form of the more important receiverships and features of administration, discussing the question of accounting.

American Railway Accounting Officers Meeting (81670). 9500 w. Ry Age Gaz—Oct. 5, 1917. Universal through interline way billing, accounting for Government business, and other reports.

**American Business**

United States Chamber of Commerce Mobilizes American Business (81513 A). 4500 w. Met & Chem Eng—Oct. 1, 1917. Reviews the work of the convention at Atlantic City, N. J., Sept. 17 to 21.

**Appraisals**

Accurate Appraisals by Short Methods (74318 A). John G. Morse. Abstract. 4000 w. A S M E, Jl—Nov., 1916. Explains method.

Obsolescence in Appraisals for Rate Making (74372). C. C. Harshman. 1600 w. Eng News—Nov. 2, 1916. Argument for considering insurance against loss by obsolescence separate from depreciation indemnity.

The Relation Between Perpetual-Inventory Value and Appraisal Value (74998 A). Charles Piez. 1800 w. A S M E, Jl—Dec., 1916. Their value in determining cost of product and other factors. (Abstract.)

The First Steam Railroad Appraisal by the Illinois Public Utilities Commission (76079). 1000 w. Eng & Con—Jan. 17, 1917. Information from the Jan. Bulletin of the Commission.

Accurate Appraisals by Short Methods (76471 A). 1800 w. A S M E, Jl—Feb., 1917. Discussion of J. G. Morse's paper.

Relation Between Perpetual-Inventory Value and Appraisal Value (76995 A). 5500 w. A S M E, Jl—March, 1917. Discussion of Charles Piez's paper.

Industrial Property, Collateral Costs, and Intangible Values (78327 A). Charles W. McKay. 3000 w. Ind Man—May, 1917. Necessary factors in valuing an industrial plant.

Overhead Charges as Applied to Appraisal Reports (80818 A). Allen F. Brewer. 2000 w. Ind Man—Sept., 1917. Explains modern methods of apportioning various items for use in public utility appraisals.

Relation of Appraisal to Industrial Management (81446 A). Charles W. McKay. 4000 w. Ind Man—Oct., 1917. Importance of reliable methods of industrial appraisement.

Comparison of Appraisal Methods (82090 A). Allen F. Brewer. 2500 w. Ind Man—Nov., 1917. Systems for industrial plants, differing somewhat from those for public utilities. Suggestions.

Fundamentals of Industrial Appraisement (82091 A). Charles W. McKay. 5500 w. Ind Man—Nov., 1917. Statement of elementary principles and definitions.

**Auditing**

System of Auditing on the Boston & Maine (81293). 3500 w. Ry Age Gaz—Sept. 21, 1917. Reports to the freight accounting office have been greatly simplified.

**Averages**

The Dangerous Average (80820 A). G. W. Greenwood. 6000 w. Ind Man—Sept., 1917. Shows how misleading general averages may be when misapplied.

**Bonds**

Surety Bonds Under Government Contracts (79987). 4500 w. Eng & Con—July 18, 1917. Abstract of a paper by William B. King reviewing important cases under the Federal statute for the protection of persons furnishing material and labor for public works in the United States.

Fundamental Features of a Sound Public Utility Bond (80498). F. K. Shrader. 2800 w. Elec Rev & Wes Elec—Aug. 11, 1917. Legal, physical and economic considerations which offset the security.

Serial Bonds for Road Building Save Money (80827). M. O. Eldridge. 4000 w. Eng News-Rec—Aug. 30, 1917. Tables and diagrams show that sinking-fund and annuity methods cost taxpayers many millions.

Is Interest Return an Index of Safety? (81508). Albert H. Bickmore. 1800 w. Elec Rev & Wes Elec—Sept. 29, 1917. Reasons why public utility bonds yield higher interest with better security.

**Bonus Payments**

Increasing Production and Wages by Paying Bonus (82092 A). E. N. Hay. 4000 w. Ind Man—Nov., 1917. How efforts were stimulated in a large creamery.

**Charges**

The Distribution of Establishment Charges (81093 A). F. T. Clapham. 2500 w. Engr—Aug. 31, 1917. Critical discussion of practice with suggestions.

**Chemical Influence**

Chemistry and the Banker. I. The Chemist. Arthur D. Little. II. The Banker. G. A. O'Reilly (81802 A). 6000 w. Met & Chem Eng—Oct. 15, 1917. Two important addresses at meeting of Am. Chem. Soc. The need of closer relations.

**Commerce**

The Relation of Banking to Industry (75903 A). Frank A. Vanderlip. 2000 w. Gen Elec Rev—Jan., 1917. Plea for closer coöperative relation between the government and the industries.

**Cost Chart**

See same heading under MECHANICAL ENGINEERING, *Measurement.*

**Cost Keeping**

Cost Keeping Methods for Concrete Construction (74811). From thesis by Harry J. Gould. 2200 w. Eng & Con—Nov. 22, 1916. Outlines methods employed by the Ferro-Concrete Construction Co. of Cincinnati, Ohio.

Making a Cost Profile (74416). P. L. Mathews. 1000 w. Cl Age—Nov. 4, 1916. Outlines method for comparing mining expenses from month to month.

A Rational Theory of Prorating Joint or Indirect Costs (75038). Halbert P. Gillette. 3500 w. Eng & Con—Nov, 29, 1916. The separate plant theory and its application.

Cost Records of Drafting and Engineering (75039). 1000 w. Eng & Con—Nov. 29, 1916. Outlines system used in public works department, navy yard, Boston.

Keeping Cost Data on Municipal Work Carried Out by Day Labor (75346). A. E. Foreman. Ills. 3000 w. Can Engr—Dec. 14, 1916. Benefits resulting from the system.

Labor Cost Keeping in a Boiler Shop (76055 A). 600 w. Cas Eng Mthly—Dec., 1916. Simple and accurate method.

A Cost Keeping System for a Small Municipal Department (76461). Robert J. H. Worcester. 1500 w. Eng & Con—Jan. 31, 1917. System found satisfactory at Concord, Mass.

Cost Keeping Records for Road Construction and Maintenance in the State of Washington (81573). 1500 w. Eng & Con—Oct. 3, 1917. From paper by David H. White describing system.

**Cost Methods**

Cost Methods of Jobbing Shops. (80822 A). Charles A. Carpenter. 3000 w. Ind Man—Sept., 1917. How wages, materials purchased and other items are properly accounted.

**Costs**

Estimating Construction Costs (74532). Frederick W. Foote. 3000 w. Eng & Min Jl—Nov. 11, 1916. Considered from standpoint of the percentage of labor and material required.

Methods of Cost Determination (74923). George C. Mathews. 3000 w. Telephony—Nov. 25, 1916. Problems of cost analysis. Especially relating to telephone service.

Practical Costs (74947 A). Earl S. Cook. 2000 w. Ind Man—Dec., 1916. First article of a series showing how to eliminate guesswork.

Cost of Railroad Transportation, Railroad Accounts, and Governmental Regulations of Railroad Tariffs (74935 C). 38 pp. A R E A—Sept., 1916. Extract from annual report of L. & N. R. R. submitted by Albert Fink in 1873-74.

Practical Costs (75618 A). E. S. Clark. 1600 w. Ind Man—Jan., 1917. General method of analyzing and calculating items that comprise the overhead charges of a plant.

Preliminary and Indirect Costs (75177 A). F. B. H. Paine. 6500 w. Tel Engr—Dec., 1916. Read before the W. Va. Utilities Assn. Explanatory review of the subject.

A Standard Cost System for Manufacturers (75874 A). 8000 w. Eng Rev—Dec., 1916. Report of the Federal Trade Commission of the United States.

Production and Cost System for the Foundry (75726 D). Ills. 6500 w. Iron Age—Jan. 4, 1917. Special No. Obtaining cost of individual lots of castings.

A New Method of Determining Factory Costs (76056 A). William Kent. 2000 w. Cas Eng Mthly—Dec., 1916. Outlines method termed "combination system."

Synthetic Costs (76181 A). J. K. Mason. 1500 w. Cas Eng Mthly—Jan., 1917. How cost records should be determined from an analysis of the distribution of expense.

Practical Costs (76958 A). Earl S. Clark. Ills. 1500 w. Ind Man—March, 1917. Third article of a series. Considers distributing the burden.

Practical Costs (78324 A). Earl S. Clark. 1500 w. Ind Man—May, 1917. Fourth article of a series. Relation of individual to average costs.

The Basis of Manufacturing Costs (78889 A). H. L. Gantt. 1000 w. Ind Man—June, 1917. Importance of getting at actual factory costs in connection with government work.

Analyzing Manufacturing Costs to Increase Profits (80156 A). C. W. Starker. 3000 w. Ind Man—Aug., 1917. How the Westinghouse Co. records and uses statistics of production, costs, sales, etc.

What the Executive Should Know About Costs (80157 A). S. Gilman. Ills. 2500 w. Ind Man—Aug., 1917. Method of visualizing the progress of work through a plant and effectively utilizing the results.

Educating the Executive to Appreciate Costs (81143 A). Robert S. Pasley. 2000 w. Jl Actcy—Sept., 1917. Outlines methods of allocating expenses in a departmental system of accounting.

Foundry Costs (81945 A). F. T. Clapham. 1200 w. Engr—Oct. 5, 1917. Considers establishment charges and shop costs, distribution of costs, and costing by labor.

**Depreciation**

Side Lights on Depreciation Problems of Utilities (75435). Harry Barker. 3100 w. Eng News—Dec. 21, 1916. Serial, 1st part. A proposed system of definitions to simply the subject and remove confusion.

Principles Involved in Computing the Depreciation of Plant (76170 N). F. Gill and W. W. Cook. 18 pp. Instn E E—Jan., 1917. Discusses principles governing the question.

Treatment of Depreciation in Railway Income Statements (76162 A). Thomas R. Lill. 1200 w. Jl Actcy—Jan., 1917. Argument that depreciation should be shown as a separate item of expense.

Depreciation of Plant (76933). 1200 w. Times Eng Supp—Jan. 26, 1917. Review of common methods of calculating.

Depreciation and Measurement of Expired Outlay on Plant (77042). E. A. Erickson. 3000 w. Eng & Min Jl—March 3, 1917. Serial, 1st part. On one phase of mining-corporation accounting. Present system condemned.

Principles of the Calculation of "Straight Line" Depreciation (77619 A). Allen F. Brewer. 500 w. Ind Man—April, 1917. Method most generally followed in the appraisal of utility corporations.

Discussion on "Principles Involved in Computing the Depreciation of plant" (77932 N). 14500 w. Instn E E, Jl—March, 1917. Discussions of paper by F. Gill and W. W. Cook.

Principles Involved in Computing the Deprecation of Plant (79324 N). 2200 w. Instn E E, Jl—May, 1917. Short discussions on paper by F. Gill and W. W. Cook.

Depreciation of Electrical Machinery (79951). William H. Easton. 2200 w. Am Mach—July 19, 1917. Information and suggestions.

**Drainage**

The Work of the Referee: Accounting and Efficiency as Applied to Drainage Matters (79820 N). E. G. Minder, with discussion. 2500 w. Af Eng Soc of Minn, Bul—July, 1917.

**Economic Alliances**

European Economic Aliances After the War (79098 A). Parker Thomas Moon. 12 pp. Col Univ Qly—June, 1917. Reviews recent suggestions and economic policies advanced.

**Economics**

The Empire's Assets and How to Use Them (78188 A). Alfred Bigland, with discussion. 8000 w. Roy Soc Arts, Jl—March 30, 1917. Conditions at the close of the war, with suggestions for a combined economic policy.

**Electrical Industries**

Die Elektrizitätewerkbetriebe im Lichte der Statistik (74854 B). 4300 w. Elek u Masch—Oct. 1, 1916. Statistics of electrical industries and their interpretation.

**Electrification**

Commercial Aspects of Electrification of Steam Roads (74258 A). J. G. Barry. 700 w. Gen Elec Rev—Nov., 1916. Advantages to be secured.

Some Aspects of Electrification Finance (74259 A). William J. Clark. 1500 w. Gen Elec Rev—Nov., 1916. Shows how operating expenses have been increasing and revenue falling off. Suggestions.

**Engineers**

Marketing Engineering Ability (75472). C. Francis Harding. From address before Am. Assn. of Engrs. 1800 w. Eng & Con—Dec. 20, 1916. How to advance the engineering profession.

The Engineer, His Relation to Capital, to Labor and to Production (75303 A). E. S. Carman, with discussion. Charts. 17 pp. Cleve Eng Soc, Jl—Nov., 1916. His relation to the industrial world.

**Exchange**

Les Changes (79423 B). Chart. 1300 w. La Nat—May 19, 1917. Fluctuations in the value of exchange at different money centers of the world since the war began.

**Farm Labor**

The Farmer's Labor Income (75335 F). Paul L. Vogt. 15 pp. Am Ec Rv—Dec., 1916. Problem of farm incomes.

**Federal Reserve**

What the Federal Reserve System Has Done (79119 N). H. Parker Willis. 19 pp. Am Ec Rev—June, 1917. Results that have been accomplished and work undertaken.

**Franchises**

The Economic Aspects of Franchises (78306 A). F. W. Doolittle. 37 pp. E Cb St L—March-April, 1917. Efficient management of public utilities.

**Gold**

The Value of Gold in War Time (78562 N). E. O. G. Shann. 3500 w. Cham Mines W Aust, Mthly Jl—Jan. 31, 1917. Explains its national function.

**Graphic Methods**

Work vs. Cost (77621 A). J. K. Mason. Chart. 1200 w. Ind Man—April, 1917. Chart showing relation between flow of work and flow of money, using a factory as an illustration.

**India**

Development of Banking and Thrift in India (80095 A). A. C. Chatterjee, with discussion. 7000 w. Roy Soc Arts, Jl—

July 6, 1917. Considers the economic development.

**Industrial Power**

The Central Station and the Small Factory (74948 A). Charles A. Carpenter. 1200 w. Ind Man—Dec., 1916. Comparison of costs shows advantage of purchased power.

**Inventories**

Continuous Inventories: Their Preparation and Value (74682 D). Harry E. Carver. 12 pp. A I E E, Pro—Nov., 1916. Advisability of attempting an inventory and its preparation.

The Effect of Recent Decisions on the Work of Inventory and Appraisal (74677 D). Philander Betts. 6 pp. A I E E, Pro—Nov., 1916. Must be classified as to age, condition, and use.

Monthly and Yearly Inventories (80819 A). H. A. Russell. 3000 w. Ind Man—Sept., 1917. Explains methods used by a large agricultural implement factory.

**Investments**

Investments Abroad (78289). 5000 w. Times Eng Supp—Mar 30, 1917. Relation to foreign trade. Shipping, exports, etc.

**Kansas**

Industrial Development in Kansas (78813 A). P. F. Walker. 7000 w. Kan Engr—1916-17. Conditions favorable and unfavorable to industrial development with statistics of principal industries.

**Legislation**

The Arkansas Blue-Sky Law (80072). John T. Fuller. 2200 w. Eng of Min, Jl—July 21, 1917. Acts to provide for regulation of investment companies.

**Liberty Loan**

The Liberty Loan, Its Economic Status and Effects (78922). F. A. Vanderlip. 2500 w. Eng & Min Jl—May 26, 1917. Its possibilities from all points of view.

**Lumber Industry**

The Price Problem in the Lumber Industry (81161 F). Wilson Compton. 16 pp. Am Ec Rev—Sept., 1917. An exposition of the price situation, and the influences affecting prices. References to Prof. G. A. Stephens article on "Determinants of Lumber Prices."

**Marketing**

Marketing Functions and Mercantile Organization (79121 N). L. D. H. Weld. 12 pp. Am Ec Rev—June, 1917. Considers services performed in the marketing process

**Metal Trades**

Exporters Discuss Post-War Prospects (79704 A). 5000 w. Iron Age—July 5, 1917. Excerpts from principal papers of "Metal Trades Day" at Springfield Industrial Exposition and Export Conference.

**Mining Finance**

Anaconda's Finances (79267). W. R. Ingalls. Ills. 4000 w. Eng & Min Jl—June 16, 1917. Analytical study of the finances of the copper mining company.

Observations on Attracting Capital (80908). J. F. Kellock Brown. 2500 w. Eng & Min Jl—Sept. 1, 1917. Urging rational methods of financing mines.

**Mining Stock**

Investments in Mines (77190). J. B. Tyrrell. 1200 w . Cn Min Jl—Mrch 1, 1917. Precautions that should be taken to avoid losses in mining stock.

**M. K. & T.**

Transportation Expenses on the Katy (77187). 2500 w. Ry Age Gaz—Mrch 9, 1917. Analysis of reasons for small trainload with suggestions.

**Money Mobilization**

Helping the Financial Mobilization (79043). 2000 w. Elec Wld—June 2, 1917. Conditions causing great demand for energy.

**Money System**

A Decimal Money System (76691 A). John Johnston. 2500 w. Elec'n—Jan. 26, 1917. A plea for the pound.

**Pay Roll**

Proving the Pay Roll (77708 A). G. W. Greenwood. 500 w. Ind Man—April, 1917. Simple method for checking pay roll disbursements.

**Pensions**

A Co-operative Insurance and Pension System (76778). Edward E. Rice. Abstract of paper before A. E. R. A. 5000 w. Elec Ry Jl—Feb. 17, 1917. Features of suggested system.

Pensions and Minimum Wage Laws (76777) James D. Mortimer, Henry C. Bradlee, Edwin W. Rice. Jr. 8000 w. Elec Ry Jl—Feb. 17, 1917. Present pension practice with analysis of cost factors. Types of wage laws, etc.

Using Established Insurance Companies (77321 A). Edward E. Rice. 10 pp. A E R A—Feb., 1917. A co-operative insurance and pension system explained.

**Poland**

The Industries of Poland (80117 A). Map. 1500 w. Engr—July 6, 1917. Shows very satisfactory progress and promise for the future.

**Power Costs**

Getting at the Cost of Power (75487). C. W. Whiting. 1200 w. Power—Dec. 26, 1916. Difficulties and means of overcoming them.

How Power and Heating Costs Are Determined (77345. 1500 w. Prac Eng, Chi—March 15, 1917. Form sheets employed in a large building.

Chart for Determining Power Costs (79049). H. Bailey. 1000 w. Power—June 5, 1917. Chart and explanation of its use in determining the cost of power for street lighting at different rates and lighting schedules.

**Price Combinations**

Open Price Associations (79123 N). H. R. Tosdal. 22 pp. Am Ec Rev—June, 1917. Discusses associations of competitors formed for the purpose of improving business conditions, with summary and conclusions.

**Price Fixing**

Price Fixing by Edict or Agreement? (81755 A). H. V. Coes. 1200 w. Iron Age—Oct. 11, 1917. Dangers that result from arbitrary action.

**Prices**

Intensive Production Establishment Charges and Selling Prices (79591 A). F. T. Clapham. Read before Exeter Chamber of Commerce. 3000 w. Engr—June 8, 1917. Explains the meaning of establishment charges and the relationship of labor.

**Profit Sharing**

Some Experiences with Profit Sharing (76957 A). Dwight T. Farnham. 6000 w. Ind Man—March, 1917. Conclusions from extensive study of this plan.

**Public Utilities**

Depreciation and Value of Public Utilities (75308 A). Charles C. James. 2500 w. Jl Actcy—Dec., 1916. Critical discussion.

The Control of Return on Public Utility Investments (75337 F). Edmond E. Lincoln. 2000 w. Am Ec Rv—Dec., 1916. Reply to Prof. Bauer's article.

**Purchasing**

The Two Great Principles of Successful Buying (74295). H. B. Twyford. 2000 w. Prac Eng, Chi—Nov. 1, 1916. Specifications and competition.

Fundamental Requisites in Purchasing (76962 A). H. B. Twyford. 2500 w. Ind Man—March. 1917. Suggestions. Care in the exactness of requisitions.

Factory Purchasing System—Methods and Records (80160 A). H. A. Russell. 3500 w. Ind Man—Aug., 1917. Methods used by a large agricultural machinery and tool manufacturing plant in the Eastern United States.

**Railway Finance**

Kansas City Railroad Collection Bureau (74386). H. W. Myers. 4000 w. Ry Age Gaz—Nov. 3, 1916. From paper before Soc. of Ry. Financial Officers. The operation of the bureau and the fundamental principles of the plan.

The War's Effect on American Railway Finance (79549 B). 1500 w. Ry Age Gaz—June 22, 1917. (Special No.) Price for obtaining new money has been greatly advanced.

**Rates**

The Making of Rates After Valuation (80246 B). William J. Norton, with discussion. 25 pp. West Soc Engrs, Jl—May, 1917. Rate regulation, preferably state regulation.

**Rate Valuation**

Giving Local 100 Per Cent Service (74722). H. S. Cooper. 2500 w. Elec Ry Jl—Nov. 18, 1916. Performance of such service considered as basis for rates.

**Records**

An Office Record System for Civil Engineers (75037). J. L. Parsons. 4500 w. Eng & Con—Nov. 29, 1916. Methods and reasons for their adoption.

**Recuperation**

Economic Recuperation After War (78089 N). W. R. Scott. 4500 w. Instn E & S Scot—March, 1917. Changed conditions and their effects.

**Reserves**

The Reserves Situation in the Federal Reserve System (81157 F). Ray B. Westerfield. 20 pp. Am Ec Rev—Sept., 1917. Recent changes to centralized federal reserve system are explained and how the original plan has been amended.

**Review of 1916**

Financial Review of 1916 (75790). Osmund Phillips. 3000 w. Min & Sci Pr—Jan. 6, 1917. Retrospect of financial conditions and analysis of possibilities.

**Salesmanship**

Salesmanship from the Standpoint of the Buyer (78498 A). R. G. Clapp. 3500 w. Gen Elec Rev—May, 1917. Qualities of good salesmanship.

**Savings Plan**

The New York Edison Savings and Loan Plan (75190). 3000 w. Elec Rv & Wes Elec—Dec. 9, 1916. Plan adopted for encouraging savings habit.

**Selling**

The Sales Engineer and His Relation to Production and Machine Design (74311 A). Arthur J. Baker. Ills. 3000 w. A S M E, Jl—Nov., 1916. Presented to Cincinnati Sec. Beneficial effect of his services.

Advantages of Direct Selling (77753 A). James N. Heald. 2000 w. Machy—April, 1917. Advantages and disadvantages discussed.

**Shop Costs**

I. Factors Affecting Costs of Structural Steel Shop Work. E. W. Pittman. II. Some Items Affecting Cost of Structural Steel Work. George H. Danforth.

III. Discussion (77274 B). 33 pp. Engrs' Soc of West Penn, Pro—Dec., 1916. Two papers discussed together.

**Taxation**

Mine Taxation in the United States (78224 F). Lewis Emanuel Young, with bibliography. 255 pp. Univ Ill—Dec., 1916. Report upon the eperience of the important mining states.

Federal Taxation Legislation (80442 A). 2500 w. Jl Actcy—Aug., 1917. Undesirable features and probable effects of portion of bill now before Congress.

Proposed Federal Taxation of Railroads (80315). 5000 w. Ry Age Gaz—Aug. 3, 1917. Objections to excess profits and surplus taxes.

**Taxes**

Excess Profits Tax in Great Britain (79116 A). James Wright. 1500 w. Jl. Actcy—June, 1917. States principles and shows their working.

**Telephone**

Cost Basis for Telephone Rates (74716). George C. Mathews. 2500 w. Telephony—Nov. 18, 1916. Importance and limitations of cost analyses in fixing rates.

Total Cost of Telephone Service (74538). George C. Matthews. 2800 w. Telephony—Nov. 11, 1916. Elements of total cost.

**Technical Business**

The Commercial Development of Technical Businesses (79692 A). George H. Gibson. 2200 w. Gen Elec Rev—July, 1917. The essentials of success.

**Trade**

Possibilities of American Trade With Russia (77625 A). J. Vichniak. 3500 w. Ind Man—April, 1917. Opinions of a Russian engineer.

Canada's Import Trade With United States (80559 A). William Lewis Edmonds. 1800 w. Iron Age—Aug. 16, 1917. Interesting features of past year. Value of metals, minerals and manufactures was largest on record.

The Merchant Trade and Its Present Day Difficulties (80790 A). Also Editorial. 5000 w. Ir & Cl Trds Rev—Aug. 10, 1917. Extracts from report of the Merchants' Committee of the London Chamber of Commerce on the subject of merchant trading.

Governments Must Help Trade After War (81899). George E. Roberts. 3500 w. Auto—Oct. 18, 1917. Address to the Editorial Conference.

**Trade Union**

Trade Union and Trade Unions (80038). 3000 w. Times Eng Supp—June 29, 1917. Trade-Unions, their effect on industry in England; suggested changes, etc.

**Valuation**

Overhead Charges in Valuation (74345 A). P. J. Kealy. 12 pp. A E R A—Oct., 1916. Charges associated with reproduction.

Productive Capacity a Measure of Value of an Industrial Property (74317 A). H. L. Gantt. Abstract. 1800 w. A S M E, Jl—Nov., 1916. Important factors for determining value.

The Valuation of Land (74787 D). L. P. Jerrard, Jun. 12000 w. A S C E, Pro—Nov., 1916. Methods and procedure.

List of References on Valuation of Steam Railways (75155 C). 146 pp. A R E A, Bul—Oct., 1916. Prepared by Bureau of Ry. Economics, Washington.

Protest Against the Federal Valuation (75329). 3000 w. Ry Age Gaz—Dec. 15, 1916. Objections to figures in Government Report.

Railroads Involved Protest Against First Two Tentative Valuation Reports (75372). 2500 w. Eng Rec—Dec. 16, 1916. Exceptions to findings of Interstate Commerce Commission.

The Valuation of Bedded Mineral Land (75052). F. A. Guignon. 2500 w. Eng & Min Jl—Dec. 2, 1916. Formulae for determining value under different conditions.

Valuation of Industrial Properties vs. Valuation of Industrial Methods (74999 A). Walter N. Polakov. 1500 w. A S M E, Jl—Dec., 1916. Importance of proper methods of using property. (Abstract.)

Aspects of the Reproduction Theory of Valuation (76327). W. R. McCann. 2500 w. Wis Engr—Jan., 1917. Typical court decisions are discussed.

Report of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities (76066 D). 230 pp. A S C E, Pro—Dec., 1916.

The Appraisal of Manufacturing Plants (76270 A). Charles W. McKay. 4000 w. Ind Man—Feb., 1917. Outlines a method of valuing factories at a minimum cost.

The Rating of Waterworks (75647 A). Charles Clifton. Read before Instn of Water Engrs. 3000 w. Surv'r—Dec. 15, 1916. Suggestions useful in analyzing assessments.

The Valuation of Land (76295 D). 12 pp. A S C E, Pro—Jan., 1917. Discussion of L. P. Jerrard, Jun's paper.

Two Valuation Sessions (75856 A). 18,000 w. A S M E, Jl—Jan., 1917. Topical discussions.

A Unique Report on Missouri, Kansas & Texas (76753). 3500 w. Ry Age Gaz —Feb. 16. 1917. Study of the value of each mortgage line as an independent road and as part of the Katy system.

Commission May Not Determine Final Valuation (76484). 4000 w. Ry Age Gaz —Feb. 2, 1917. Has decided to report elements of value only.

Hearing on Valuation Protests Concluded (76618). 2500 w. Ry Age Gaz—Feb. 9, 1917. Arguments before the Interstate Commerce Commission.

How Does Industrial Valuation Differ from Public Utility Valuation? (76465 A). John H. Gray. 5000 w. A S M E, Jl—Feb., 1917. Deals chiefly with valuation of public utilities for purposes of fixing rates.

Michigan Puts Selection of Road Types on Business Basis (76512). D. A. Thomas. 2500 w. Eng Rec—Feb. 3, 1917. Road-mile method of valuation followed.

Productive Capacity a Measure of Value of an Industrial Property (76472 A). 3000 w. A S M E, Jl—Feb., 1917. Discussion of H. L. Gantt's paper at New York meeting.

Reproduction Cost and Life of Water Works Plant of Bath Water District (76719). 3000 w. Eng & Con—Feb. 14, 1917. Investigation and appraisal of a Maine plant.

Some Features of the Federal Valuation of Railroads (76887 A). Pierce Butler, with discussion. 30 pp. West Ry Cb, Pro—Dec. 18, 1916. The purpose, importance of the work, questions involved, etc.

Valuation of Sewerage Systems (76715). Clinton S. Burns. 3000 w. Eng & Con—Feb. 14, 1917. Problems in the appraisal of sewer systems.

Hearing on Tentative Railway Valuations (77697). 5000 w. Ry Age Gaz—March 30, 1917. Arguments as to whether commission should find final value.

A Rule for Testing Tax Valuations of Railroads (78064 N). Mark A. Smith. 15 pp. Am Ec Rev—March, 1917. Investigations to determine whether a mathematical rule could be used to assist in establishing fairness of valuation.

Discussion on Report of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities (78319 D). 13 pp. A S C E, Pro—April, 1917. Continued discussion.

Hearing on Tentative Railway Valuations (77836). 4000 w. Ry Age Gaz—April 6, 1917. Summary of testimony at hearing of Interstate Commerce Commission. Devoted to general principles.

How the Delaware and Hudson is Handling Its Valuation Fieldwork (77856). George H. Burgess. Ills. 2000 w. Eng News Rec—April 5, 1917. Methods of compiling records of permanent way.

The Preparation of Unit Prices for Valuing Public Utility Properties in War Times (79182). John M. Ray. 1500 w. Wis Engr—May, 1917. Important steps in fixing unit costs for such use, and the effect of war prices.

Making Industrial Valuation For Tax Purposes (80180). George E. Barrows. 2500 w. Eng News-Rec—July 26, 1917. Appraisal of machinery and equipment made quickly in Buffalo.

The Federal Valuation of Railways (79812 B). Towson Price. 1200 w. Stev Indic—April, 1917. Chiefly the valuation of the rolling stock and machinery.

Rolling Stock and Machinery Valuation (80185). W. R. Maurer. 5000 w. Ry Age Gaz—July 27, 1917. Suggestions for handling the Federal valuation work.

Discussion on Report of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities (80671 D). 14 pp. A S C E, Pro—Aug., 1917. Continued discussion.

The Valuation of Land (80660 D). Ills. 2000 w. A S C E, Pro—Aug., 1917. Continued discussion of L. P. Jerrard's paper.

Accounting Features of Public Utility Valuations (81141 A). E. B. Wade. 3000 w. Jl Actcy—Sept., 1917. Outlines various phases of this work.

Making the Valuation Records Permanent (81759). James G. Wishart. Ills. 2500 w. Eng News-Rec—Oct. 11, 1917. Forms used by C. R. I. & P. Ry. keep information up to date.

The Government Position on Valuation (81669). C. A. Prouty. 9500 w. Ry Age Gaz—Oct. 5, 1917. Attitude of the Federal Forces on the more important questions presented by the Texas Midland.

See same heading under CIVIL ENGINEERING, *Water Supply*.

**Valuation Maps**

Making and Filing Valuation Maps (76759). James G. Wishart. Ills. 2500 w. Eng Rec—Feb. 17, 1917. Serial, 1st part. Organization of Rock Island Lines has been carefully worked out. Useful suggestions based upon experience of the past three years.

**Wage Law**

The Railway Wage Law (74846 A). Charles Nagel. 15 pp. E Cb St L, Jl—

Sept.-Oct., 1916. Critical discussion of the "eight hour law."

**Wages**

An Application of the Modern Theory of Wages (75238 A). Felix Bayle. 4500 w. Ir & Cl Trds Rev—Nov. 24, 1916. A scale for wartime.

Wage Arbitration and Contracts (76879). Bentley W. Warren. 2200 w. Elec Ry Jl—Feb. 24, 1917. Public supervision seems desirable.

Wage Arbitration and Contracts (77322 A). Bentley W. Warren. 9 pp. A E R A—Feb., 1917. Interest of public in wages paid and service rendered.

Amalgamated Society of Engineers (78563 N). 2500 w. Cham Mines W Aust, Mthly Jl—Jan. 31, 1917. Wages and conditions in Australia. New schedule proposed.

Tested Plans That Add to an Employee's Income (80161 A). Wilfred G. Astle. 4000 w. Ind Man—Aug, 1917. Outlines profit-sharing, stock participation, pension and insurance plans that have been tested.

A Piece-Profit System of Wage Payment (82094 A). Eugene Wera. Charts. 2500 w. Ind Man—Nov., 1917. A combination of day wages and bonus that has given satisfactory results.

**War Expenses**

War Expenditures (82060 A). 9 pp. Eff Soc Jl—Oct., 1917. Problem of government finance.

**War Loans**

Selling Securities Direct to the Public (78148). Ills. 1500 w. Ry Age Gaz—April 20, 1917. Methods being followed in England, France and other warring countries.

## MANAGEMENT

**Administration**

Administration: Its Principles and Their Application (74676 B). William Hemphill Bell. 22 pp. **Fkn Inst, Jl**—Nov., 1916. General discussion.

Chicago's Coöperative Administrative Research (77702 A). F. M. Simons, Jr. 5500 w. Ind Man—April, 1917. Investigations at the University of Chicago in an attempt to arrive at a standard.

The Principles of Industrial Administration (77015 A). George Edson Toogood. 2000 w. Ir & Cl Trds Rev—Feb. 9, 1917. Serial, 1st part. Value of scientific management in the development of industry.

**American Citizenship**

Americanizing a Thousand Men (78892 A). Luther D. Burlingame. Ills. 3000 w. Ind Man—June, 1917. Details of methods employed among alien employees of a large establishment.

**Army**

See SPECIALIZATION.

**A. S. M. E. Discussions**

General Session (79674 A). 11 pp. A S M E, Jl—July, 1917. Discussion of four papers of F. W. Marquis; Victor B. Phillips; Henry Kreisinger and J. F. Barkley; and Sanford E. Thompson, William O. Lechtner, K. Hall and H. J. Guild.

**Bonus Payments**

See same heading under FINANCE AND COSTS.

**Bonuses**

Bonuses to Workmen in French Shops (75022 A). L. Revillon in *Rev. de Met.* 2000 w. Iron Age—Nov. 30, 1916. The Rowan system in which the bonus is proportioned to the time saved.

Systems Of Payment In Factories (75578). 3300 w. Times Eng Supp—Nov. 24, 1916. Taylor, Gantt, Emerson and other systems compared.

**Bonus Systems**

Formule Générale De Salaires Modernes (74903 B). Carvallo. 1200 w. Gen Civ—Nov. 4, 1916. Mathematical exposition of Bayle and Carvallo premium systems.

**Catskill Aqueduct**

The Catskill Aqueduct Builders (81756). Photograph. 4500 w. Eng News-Rec—Oct. 11, 1917. An appreciation. How J. Waldo Smith developed an engineering organization noted for ability, loyalty and enthusiasm.

**Central Stations**

What Would You Do as General Manager? (78532). 1500 w. Elec Wld—May 5, 1917. Developing the business of the average small central station.

**Choosing Employees**

Choosing Employees by Test (75610 A). W. F. Kemble. Ills. 7500 w. Ind Man—Jan., 1917. Testing applicants for employment on basis of physical ability, lifting power, strength of arms, hands, and fingers.

Illogical Methods of Rating Human Qualities in Selecting men, or Accounting for Relative Success (76458). Halbert P. Gillette. 1500 w. Eng & Con—Jan. 31, 1917. Questions the rationality of attempts to estimate the relative importance of mental qualities.

**Cloth Cutting**

Planning the Cutting of Cloth (79454 A). Henry D. Minich. Ills. 2500 w. Ind Man—July, 1917. Results in shirt factories from the adoption of improved methods.

**Control System**

Lodge and Shipley Control System (82096 A). D. M. Perrill. Ills. 2500 w. Ind Man—Nov., 1917. Method of keeping track of the progress of work.

**Coöperation**

The Co-operations of Peace vs. the Competitions of War (74695). Carl Scholz. 2500 w. Cl Age—Nov. 18, 1916. Presidential address before the Nat. Mining Cong.

A Practical Plan of Engineering Co-Operation (77614 A). F. H. Newell. 5000 w. Clev Eng Soc, Jl—March, 1917. Changes made necessary by the world war.

Co-operation from an Engineering Standpoint (77125). Walter V. Turner. 3000 w. Elec Jl—March, 1917. Based on an address before the Westinghouse Air Brake Co.'s employees.

L'Entente Industrielle Et Coloniale (78291B). H. Jumelle. 4600 w. Rev Gen Sci—Mar. 30, 1917. Possible industrial coöperation by many nations in near future.

Voluntary or Compulsory Co-operation (79450 A). 1000 w. Ind Man—July, 1917. Editorial on the urgency of voluntary wartime co-operation in industry.

**Diagrams**

Visualizing the Essential Facts of a Business (74776 A). E. D. Farnham. 3000 w. Cas Eng Mthly—Nov., 1916. Simple method for making operating data show facts by use of diagrams.

**Discussion**

Discussion (79566 A). C. V. Corless and George L. Hedges. 1200 w. Ind Man—July, 1917. Working explosively vs. working efficiently.

**Economics**

Economic Problems of the Engineering Industry (74483 A). F. W. Reed. Presidential address before the Manchester Assn. of Engrs. 4500 w. Mech Engr—Oct. 20, 1916. Preparing for the cessation of hostilities.

The Economics of Empire (76815 N). Moreton Frewen. 6500 w. N E C Instn—Feb., 1917. British economic problems are briefly discussed.

**Efficiency**

Common Sense as a Basis for Efficiency (74955 A). George H. Shepard. 6000 w. Ind Man—Dec., 1916. Principles and their applications, and higher common sense.

Practical Efficiency (74757 A). F. B. Jacobs. 2000 w. Mech Wld—Nov. 10, 1916. Suggestions from plants showing efficient management.

Scientific Management and Industrial Efficiency (74729 N). Ralph N. Lewis. 1500 w. Comwh Engr—Oct. 2, 1916. An efficiency society for Australia.

The Problem of Efficiency (74601 N). James R. Finlay. 3000 w. Col Sl Min Qt—July, 1916. The part of industrial corporations, with reference to mining.

Efficiency in Civic Undertakings (75017). Robert Owen Wynne-Roberts. 1700 w Can Engr—Nov. 30, 1916. Importance of maximum efficiency.

Federal Aid to Mining Efficiency (75008). Van H. Manning. 4500 w. Min & Sci Pr—Dec. 2, 1916. Address at Chicago, before the Am. Min. Cong.

Power-Plant Efficiency (74007 A). Victor J. Azbe. 5500 w. A S M E, Jl—Dec., 1916. Improvement possible. (Abstract.)

Working Efficiently (75616 A). Anonymous. 4300 w. Ind Man—Jan., 1917. A common sense view of efficient management in the light of humanity to workers.

Government Efficiency (76943 B). F. W. Taylor. 5700 w. Bul Taylor Soc—Dec., 1916. Hitherto unpublished article on aspects of Government employment.

Efficiency Reward (77620 A). George H. Shepard. 6000 w. Ind Man—April, 1917. Graphic presentation of the relation of bonus payment to time rate and piece rate, and the possibility of modifying the bonus to meet introduction of other factors.

Making Goods versus Making Records (78334 A). H. L. Gantt. 600 w. Ind Man—May, 1917. Plea to organize industry for the national struggle.

How to Determine Efficiency (78325 A). George H. Shepard. 5000 w. Ind Man—May, 1917. Outlines the factors to be considered.

"Working Explosively" versus "Working Efficiently" (78328 A). William H. Smyth. 1000 w. Ind Man—May, 1917. Discusses effect of mechanical efficiency.

Extracts from Address of President William A. Leavitt, Jr., of the Delaware River Branch, at the Annual Meeting, Jan. 12, 1917 (78456 A). 2000 w. Am Soc Mar Dftn, Jl—April, 1917. Importance of character and practical efficiency for draftsmen.

How to Increase Railroad Efficiency (78604). 2500 w. Ry Age Gaz—May 11, 1917. Executive committee suggests ways of co-operative service.

Efficiency (80405 A). A. L. Haas. 3500 w. Engr—July 13, 1917. Its national importance.

"German Efficiency" vs. The Democratization of Industry (80460 N). 1500 w. Can Min Inst, Bul—Aug., 1917. Criticism of C. E. Knoeppel's article in the ENGNG. MAG. by C. V. Corless.

How Railway Efficiency Helps Win the War (80591). Daniel Willard. 4000 w. Ry Age Gaz—Aug. 17, 1917. The need of better use of existing facilities.

Is the "Art of Efficiency" Efficient? (82095 A). William H. Smyth. 3500 w. Ind Man—Nov., 1917. Sums up his side of the controversy.

**Efficiency Experts**

The Reason for Efficiency "Experting" (79564 A). Charles M. Horton. 3000 w. Ind Man—July, 1917. How an efficiency engineer may make valuable suggestions.

**Employees**

Illogical Methods of Rating Human Qualities in Selecting Men, or Accounting for Relative Success (77205 A). Halbert P. Gillette. 1500 w. E Cb Phila, Pro—March, 1917. Discusses fallacies. specializing.

Judging Applicants by Form Value of Their Handwriting (79452 A). William Leslie French. Ills. 4000 w. Ind Man—July, 1917. To what extent handwriting may be depended upon as an indication of character.

Problems in Recruiting Employees (80167 A). Meyer Bloomfield. 2000 w. Ind Man—Aug., 1917. How some managers are dealing with the labor problem and the results. Announcement of National War Shipping Committee to our big shipyards.

**Employees' Organizations**

Employees' Organizations and Their Helpful Uses (82101 A). Ordway Tead. 5000 w. Ind Man—Nov., 1917. How far the interference of such bodies is advisable.

**Employment**

Proceedings of the Conference of Employment Managers' Association of Boston, Mass.: Held May 10, 1916. (74670 N). 60 pp. U S Dept Labor, Bul 202—Sept., 1916. Addresses, discussions, etc.

Employment Managers' Department (78335 A). Mayer Bloomfield. 2500 w. Ind Man—May, 1917. Progress in the new profession; its war time significance. One way to know your men.

Getting a Job With "Big Business" 78332 A). Harry Knowles. 2000 w. Ind Man—May, 1917. A boy's experience in securing employment with a large establishment.

Employment Methods in the Public Service (78330 A). Leonhard Felix Fuld. Ills. 1800 w. Ind Man—May, 1917. Methods used in New York City.

Employment Plans and Methods (79562 A). Oscar Roder. 2200 w. Ind Man—July, 1917. Outlines a simple system for the employment of workers.

Employment Problems (79565 A). Meyer Bloomfield. 3500 w. Ind Man—July, 1917. How the Fore River Shipbuilding Co. is preparing for its task.

Course of Employment in New York State from 1904 to 1916 (81188 N). 50 pp. N Y Dept Labor, No. 85—July, 1917. A study of the general problem of unemployment.

**Employment Managers**

What Is an Employment Manager? (76969 A). Meyer Bloomfield. 600 w. Ind Man—March, 1917. His duties and work.

Common Sense in Employment (77704 A). Meyer Bloomfield. 3000 w. Ind Man—April, 1917. A safety device in employment—Lessons from N. Y. City health department, etc.

The Man Problem (77406 A). D. C. Buell, with discussion. 30 pp. Ry Cb Pitts, Pro—Jan. 26, 1917. The selection, hiring, handling, educating, and promotion of railroad men.

**Engineering**

Development of Technical Businesses (77402). George H. Gibson. From address before Tech. Pub. Assn. 2500 w. Elec Rv & Wes Elec—March 17, 1917. From fundamental elements.

**Engineers**

The Hour of the Engineer (78320 A). Editorial. 6000 w. Ind Man—May, 1917. Duty and opportunity in the vast preparations for war.

Management and the Engineer (82087 A). Editorial. 1200 w. Ind Man—Nov., 1917. Need of technical knowledge and a thorough understanding of human beings.

**Engineer Troops**

Organization and Duties of Engineer Troops (79368 B). Frederick B. Downing. 2000 w. Bos Soc C E—June, 1917. Explains the usual assignment and duties.

**Explosive Working**

Working Explosively (75615 A). W. H. Smyth. 1200 w. Ind Man—Jan., 1917. Argument against systems of management that discourage individuality of the workers.

**Factory Equipment**

The Maintenance of Factory Equipment (77117 A). 4000 w. Iron Age—March 8, 1917. Discussions of the Taylor Society in Boston.

**Factory Organization**

Plant Units Make efficiency (77706). A. Ludlow Clayden. Ills. 3000 w. Auto—March 29, 1917. System in use at plant of Perfection Spring Co., Cleveland.

**Facts**

Truth or Mere Claims—Which? (80817 A). W. O. Platt. 1000 w. Ind Man—Sept., 1917. Comments on the policy of misrepresenting results of tests, production, etc.

**Fatigue**

British Study of Industrial Fatigue (76816 A). 2500 w. Iron Age—Feb. 22, 1917. Experiments apparently proving overtime to be uneconomic and productive of unsatisfactory results.

**Foremanship**

From Boss to Foreman (79456 A). Fred H. Rindge, Jr. Ills. 3000 w. Ind Man—July, 1917. Account of work for making employees more valuable.

**Foremen**

A Foreman's Responsibility and Authority (78886 A). Frederic G. Coburn. 1800 w. Ind Man—June, 1917. Authority and responsibility contrasted. A foreman's troubles.

Relations of Foremen to Working Force (78885 A). Meyer Bloomfield. 5000 w. Ind Man—June, 1917. Account of a foremen's dinner of the International Harvester Co. where 600 superintendents and foremen exchanged opinions.

The Importance of Being a Foreman (78887 A). Ordway Tead. 1500 w. Ind Man—June, 1917. Relation of foreman and workman.

Foremen Such as America Needs (80168 A). George M. Bowie. 6000 w. Ind Man—Aug., 1917. Demand for able, conscientious men of executive ability.

**French Industries**

Les Efforts De L'Industrie Française Pendant La Guerre (79408 C + D). Lindet, Baudet and Teisset. 4500 w. Soc Enc Ind Nat—Mar.-Apr., 1917. Application of metric system to the iron industry; linen weaving industry; grinding of corn barley and oats.

**Handling Men**

The New Profession of Handling Men (75609 A). Meyer Bloomfield. 3200 w. Ind Man—Jan., 1917. Functions, scope and activities of employment managers' associations.

**Human Element**

The Human Element in Industry (79065 A). George F. Blessing. 2500 w. Sib Jl Eng—June, 1917. Human problems connected with industry.

**Human Potential**

The Human Potential in Industry (79676 A). Otto P. Geier, with short discussion. 5500 w. A S M E, Jl—July, 1917. Value of welfare work is shown.

**Improving Transportation**

Efficiency To and From the Shop (75613 A). R. W. Hutchinson, Jr. Ills. 4200 w. Ind Man—Jan., 1917. Use of motor trucks in connection with mechanical loading and unloading devices.

**India**

Labor-Saving Devices and Management Opposed in India (79459 A). J. Wallace. 2500 w. Ind Man—July, 1917. Backward industrial conditions due to castes and creeds.

**Industrial Awakening**

Britain's Industrial Revolution — Its Lessons for America (80150 A). Editorial. 2000 w. Ind Man—Aug., 1917. Noteworthy speeding up of all factories.

**Industrial Councils**

Industrial Councils and the Garton Memorandum (80596 A). 3000 w. Engng—Aug. 3, 1917. Serial, 1st part. Summary of the contents of this important document.

**Industrial Engineers**

The Industrial Engineers and Preparation for War (79561 A). C. E. Knoeppel. 2500 w. Ind Man—July, 1917. What the newly organized Society of Industrial Engineers can do in the war.

**Industrial France**

Industrial France as an Object Lesson to America (81089). 1500 w. Mfrs' Rec—Sept. 13, 1917. Preparing to enter world markets with dyes, chemical and pharmaceutical products after the war is over.

**Industrialism**

Industrial Supremacy and Moral Standards (79612). Newton D. Baker. 2500 w. Auto—June 28, 1917. Address before the Editorial Conference in Washington.

**Industrial Managers**

Some of the Problems Confronting the Engineer as an Industrial Manager (78249 A). W. A. Layman. 9 pp. E Cb St L—March-April, 1917. Comments on business management.

**Industrial Relations**

Keeping Men at Their Jobs (77183). Allen Sinsheimer. Ills. 4000 w. Auto—March 8, 1917. Third of a series of articles on methods of improving industrial relations.

**Industry**

Individual Effort Versus Corporate Effort (77346 A). J. R. Finlay. Slightly abbreviated presidential address before Min. & Met. Soc. of Am. 2500 w. Met & Chem Eng—March 15, 1917. Personal observations.

Industrial Management Now and After the War (80162 A). W. Rockwood

Conover. 5000 w. Ind Man—Aug., 1917. Need of more efficient management of men and machinery.

Reorganization of Industrial Processes After the War (79903). Rockwood Conover. 3000 w. Am Mach—July 12, 1917. Analysis of conditions necessary, organization and readjustment.

The Reconstruction of Industries (80084 A). 2000 w. Engr—June 29, 1917. Views of manufacturers as to what has been done and what remains to be done for satisfactory reconstruction.

**Inspection**

The Functions of an Inspection Department (80080 A). C. Turtle. 3000 w. Mech Engr—July 6, 1917. Read before Jun. Instn. of Engrs. Outlines the work of this department.

**Jobbing Work**

Jobbing Work and Efficiency (76271 A). Charles A. Carpenter. 3000 w. Ind Man—Feb., 1917. Suggestions.

**Labor**

Monthly Review of the U. S. Bureau of Labor Statistics (76559 N). 135 pp. U S Dept Labor—Feb., 1917. With report by Alice Hamilton on "Industrial Poisons used in the making of Explosives."

The British System of Labor Exchanges (76812). B. Lasker. 63 pp. U S Dept Labor, No. 206—Oct., 1916. Their object; the difficulties, organization, methods, etc.

Engineering Methods Must Replace Paternalism in the Handling of Labor (78085). Frances A. Kellor. 3000 w. Eng News Rec—April 12, 1917. Scientific planning should be applied.

The Dilution of Labour (78863). 3100 w. Times Eng Supp—Apr. 27, 1917. Increasing employment of women in British engineering trades and occupations.

Labor Turnover in 1906, 1916 and After (79559 A). I. A. Berndt. 3000 w. Ind Man—July, 1917. Economic loss due to indiscriminate hiring; recent improvement effected.

Labor Conditions in the Hawaiian Islands (79327). James E. Foss, Jr 1200 w. Eng & Con—June 20, 1917. Character of labor supply and how it is handled.

Labor Economy (79886 A). W. L. Hichens. 2500 w. Roy Soc Arts, Jl—June 22, 1917. Address at Natl. Economy Ex. Possibilities of economy in labor.

Managing Alien Workers in War Time (80260 A). Winthrop Talbot. 2500 w. Iron Age—Aug. 2, 1917. Problem of labor supply.

The Alien and the Industrial Worker (80647 A). Winthrop Talbot. 1600 w. Iron Age—Aug. 23, 1917. Summary of requirements for Americanization.

Labor in Germany During the War (81181 A). 3500 w. Engng—Aug. 31, 1917. Changes due to the war and its consequences, wages, and developments.

Labor Legislation of 1916 (81163 A). 192 pp. U S Dept Labor, No. 213—June, 1917. Review and cumulative index of labor laws.

**Labor Maintenance**

Labor-Maintenance Service as a Factor in Management (81435 A). Dexter S. Kimball. 3000 w. Ind Man—Oct., 1917. Conditions for satisfactory industrial and social relations founded on justice.

Labor Maintenance (81432 A). 1500 w. Ind Man—Oct., 1917. Editorial introduction to a symposium of eight articles.

**Labor Saving**

The Place of Labor Saving Machinery (80165 A). Charles M. Horton. 4000 w. Ind Man—Aug., 1917. How machines assist workers and benefit humanity.

**Labor Shortage**

Contractors Meet Labor Shortage With More Plant and Better Organization (75773). Henry D. Hammond. Maps. 1500 w. Eng Rec—Jan. 6, 1917. Seriousness of labor scarcity.

Hiring the Worker (76266 A). Roy Wilmarth Kelly. 3500 w. Ind Man—Feb., 1917. Serial, 1st part. Analysis of methods in the employment department.

Labor After the War (76267 A). Lewis R. Freeman. 3000 w. Ind Man—Feb., 1917. Study of the situation in the countries of Europe.

The Relations of Employers and Employed (76179 A). Dr. Arthur Shadwell. 3000 w. Cas Eng Mthly—Jan., 1917. How to prevent the outbreak of strife.

Hiring the Worker (76965 A). Roy Willmarth Kelly. 4000 w. Ind Man—March, 1917. Second article of a series. Methods used in analyzing the nature of work for which new men are employed.

Hiring the Worker (77615 A). Roy Willmarth Kelly. 5500 w. Ind Man—April, 1917. Third part of serial gives analysis of the application forms, interview methods, etc.

**Labor Troubles**

The Labor Troubles at Butte (80900). Ills. 2000 w. Min & Sci Pr—Sept. 1, 1917. Also editorial. History of the difficulties with the Butte labor unions.

Purchase and Maintenance of Labor on Railroads (80870). E. Wanamaker. 1500 w. Ry Age Gaz—Aug. 31, 1917. Suggestions for securing competent employees.

**Labor Unions**

A New Ideal for the Labor Unions (81021). 2000 w. Eng & Min Jl—Sept. 8, 1917. Analysis of some of the existing defects, and an outline of an interesting plan for labor unions.

**Management**

Labour and Management in Manufacture (77574). 3200 w. Times Eng Supp—Feb. 23, 1917. Discussion of coördination between employer and laborer in its national aspects.

Profit Sharing in the United States (77267 A). Boris Emmet. 184 pp. U S Dept Labor, No. 208—Dec., 1916. Statistics on the present status of profit sharing.

Scientific Management and Progress (77597 B). 14000 w. Bul Taylor Soc—Feb., 1917. Discussion on H. B. Drury's paper before Congress of Human Engineering, Oct., 1916.

The Manager, the Workman and the Social Scientist (77596 B). H. S. Person. 5500 w. Bul Taylor Soc.—Feb., 1917. Interconnection of their activities and functions. How each one benefits by closer team work.

The Work of Management (79457 A). Frederick G. Coburn. 3500 w. Ind Man—July, 1917. Suggestions as to what extent training of apprentices should be undertaken.

**Managers**

The Works Manager (78866). 1500 w. Times Eng Supp—Apr. 27, 1917. Changed conditions due to the war, and how they affect the task of managers.

**Manager's Assistant**

The Assistant From the Manager's and His Own Viewpoint (80758 A). Frederic G. Coburn. 2500 w. Ind Man—Sept., 1917. Responsibilities and usefulness of an assistant, outlining both viewpoints.

**Mechanical Departments**

Mechanical Department Engineering (77695). C. A. Seley. 1500 w. Ry Age Gaz—March 30, 1917. Advantages of

**Men**

The Engineering of Men (79718 A). Willard Beahan. 4800 w. E Cb Phila—July, 1917. Organization; labor problems.

**Methods**

Correct Working Methods (76961 A). George H. Shepard. 4000 w. Ind Man—March, 1917. Time study work and methods of instruction.

Manufacturing Methods (80813 A). H. L. Gantt. 2500 w. Ind Man—Sept., 1917. Contrast between old and modern shop conditions, giving details of the production system.

**Munition Work**

Co-ordination In Munition Work (81412). 3200 w. Times Eng Supp—Aug. 31, 1917. Experience in England shows that co-ordination is the secret of successful output.

**Office Work**

Standardization in Office Work (79455 A). Walter D. Fuller. 2500 w. Ind Man—July, 1917. How the work may be classified and standardized.

**Organization**

Organization as It Pertains to Mine Management (76771). A. B. Kelley. 1800 w. Cl Age—Feb. 17, 1917. The more perfect the organization the more successful the operation.

The Need for Improved Organization in Industry (76896 N). A. W. Kirkaldy. 22 pp. Instn E & S Scot—Dec., 1916. Effects of the war and the outlook for the future.

Works Organization (77272 N). 112 pp. N E C Instn—Feb., 1917. Discussion and correspondence on paper by A. D. C. Parsons, Edwin L. Orde and G. H. Tweddell.

Engineering Organization (78281). 3500 w. Times Eng Supp—Mar. 30, 1917. Some principles of collective action.

Stores Organization (77922 A). P. J. Sims. Red Cross Assn of Min Elec Engrs—W of Scotland Branch. 4000 w. Ir & Cl Trds Rev—March 16, 1917. Refers only to collieries and the like.

Works Organization and Efficiency (78980 A). W. Ripper, with discussion. 8,000 w. Roy Soc Arts, Jl—May 11, 1917. Aims to show how it is possible to pay higher wages than before the war.

How British Railways Are Organized for War (79526 B). Henry W. Thornton. 2000 w. Ry Age Gaz—June 22, 1917. (Special No.) The way England solved its problem. Suggestions for American roads.

Organization of the Railways for War (79528 B). 2200 w. Ry Age Gaz—June 22, 1917. (Special No.) Relations between the railways and the government pertaining to war transportation.

Machine-Shop Organization (79398 A). Fred G. Kent. 4000 w. A S M E—May, 1917. Outlines the organization for a shop building the average line of machinery.

Works Organization (79443). 1800 w. Times Eng Supp—May 25, 1917. Increased production and wages. Paper by W. Ripper before Royal Society of Arts.

La Organizzazione Scientifica Delle Industrie Meccaniche In Italia (80005 B). G. Belluzzo. 3800 w. Ind—June 21, 1917. Scientific reorganization of mechanical industry in Italy.

Organization of Industry (80738). 1300 w. Times Eng Supp—July 27, 1917. Report of sub-committee of the British Reconstruction Committee on relations between employers and employed.

Some Phases of Plant Management (80871). F. J. Heavens. 2000 w. Telephony—Sept. 1, 1917. Plant organization; importance of system, accounting, etc.

Some Notes on Staff Organization in Electricity Works (80961 A). G. W. Stubbings. 2500 w. Elec Rev—Aug. 17, 1917. Whether the system in general use is capable of improvements.

**Pensions**

Assurances Sociales En Europe Et Pensions De Vieillesse Au Canada (75575 B). A. Perrault. 7200 w. Rev Tri Can —Nov., 1916. Old age pensions in Canada as compared with European systems in vogue.

**Personnel**

Human-Being Management (74957 A). 1200 w. Ind Man—Dec., 1916. Views of an altruistic executive.

Standardizing the Characteristics of Men (74949 A). Wm. Fretz Kemble. Ills. 6000 w. Ind Man—Dec., 1916. Estimates personal characteristics.

**Physical Fitness**

Measuring The Workman's Physical Fitness for His Job (75614 A). M. W. Alexander. Ills. 4200 w. Ind Man—Jan., 1917. Advantages to managers and employees of physical examination of applicants.

**Planning**

Planning Power-Plant Work (76944 B). W. N. Polakov. Ills. 18,000 w. Bul Taylor Soc—Jan., 1917. System and methods of planning, with illustrative examples.

Planning Department in Modern Shops (80996 A). Cooper. 4500 w. Iron Age —Sept. 6, 1917. Duties of the four different managerial and the four production heads, and the essential qualifications.

**Planning Bureau**

Dispatching Work of Engineering Department (80193). 5500 w. Elec Ry Jl—July 28, 1917. Working of the planning bureau of the Denver Tramway Co.

**Power-Plant Management**

Chief Engineer and His Assistants (77194). Edward H. Kearny. 3000 w. Natl Engr—March, 1917. Serial. 1st part. Interrelations desirable and the effect on power plant operation.

**Premium System**

The Rowan Premium System (75899 A). 1500 w. Engr—Dec. 22, 1916. Explanation of the system.

Mono Firemen's Premium System (78031). F. D. Harger. Ills. 2000 w. Power—April 17, 1917. Premiums based on the heat losses of the products of combustion.

**Price-Making**

Price-Making and Competition (81142 A). Earl A. Saliers. 2000 w. Jl Actcy —Sept., 1917. Importance of an accurate knowledge of costs.

**Production**

Reorganization of Production (80042). 1300 w. Times Eng Supp—June 29, 1917. New proposals of British Government in the Munitions of War Bill.

**Production Scheme**

Unit Method Used in Operating Plant (75729 D). F. L. Prentiss. Ills. 4000 w. Iron Age—Jan. 4, 1917. Special No. Production scheme in making springs.

**Public Utilities**

Able Management—How to Get and Reward It (77054). Samuel W. Fleming, Jr. 2200 w. Elec. Wld—March 3, 1917. Advantages for a reward for able management plan, to the public, to the commission and to the utility.

Discussion on Report of the Special Committee to Formulate Principles and Methods for the Valuation of Railroad Property and Other Public Utilities. Also Appendices to the report (77329 D). 50 pp. A S C E, Pro—Feb., 1917.

**Quality**

The Control of Quality (81449 A). G. S. Radford. 4500 w. Ind Man—Oct., 1917. Plan for shop inspection; its fundamental principles.

**Railroad Management**

Opportunity and Responsibility of the Railroad Man (74519). Frank A. Vanderlip. 4000 w. Ry Age Gaz—Nov. 10, 1916. Address before Soc. of Ry. Financial Officers. Urges a broad study of the railroad situation.

**Sales Management**

Applying the Scientific Method to Sales Management (74946 A). E. St. Elmo Lewis. Fourth of a series of papers. 5000 w. Ind Man—Dec., 1916. Study of the mechanics of organization; personnel, advertising, sales promotions, etc.

Applying Scientific Principles to Sales Management (76968 A). E. St. Elmo Lewis. 5000 w. Ind Man—March, 1917 Sixth article of a series. Applications of standard practice.

Applying Scientific Principles to Sales Management (77622 A). E. St. Elmo Lewis. 4500 w. Ind Man—April, 1917. Continuation of sixth part of a serial. Methods illustrating sales standards.

Applying Scientific Principles to Sales Management (78895 A). E. St. Elmo Lewis. Ills. 7500 w. Ind Man—June, 1917. Seventh article of a serial. How the interest of salesmen is aroused and maintained.

Applying Scientific Methods to Sales Management (80823 A). E. St. Elmo

Lewis. Last instalment of a serial. 5500 w. Ind Man—Sept., 1917. Best methods of remunerating salesmen. Incentives and rewards.

**Sales Records**

Applying the Scientific Method to Sales Management (76347 A). E. St. Elmo Lewis. 5500 w. Ind Man—Feb., 1917. Fifth article. Use of statistical records and other data.

**Scientific Management**

Development of Scientific Methods of Management in a Manufacturing Plant (79399 A). Sanford E. Thompson, William O. Lichtner, Keppele Hall, and Henry J. Guild. Ills. 47 pp. A S M E—May, 1917. Outlines methods as applied to the ordinary manufacturing plant.

**Scrapping**

When Is It Profitable to Retire an Old Plant Unit? (76980). 200 w. Eng & Con—Feb. 28, 1917. Outlines a solution of the problem and the reason for it.

**Shop Methods**

Routing an Order Through the Shop (78323 A). P. J. Flaherty. Ills. 2000 w. Ind Man—May, 1917. Methods employed for keeping track of an order in a shop turning out bushings and bearings.

**Shop Standards**

How to Set Shop Standards (76345 A). George H. Shepard. 6500 w. Ind Man—Feb., 1917. Outlines desirable methods.

**Socialism**

Scientific Management and Socialism (81531 A). Malcolm Keir. 4000 w. Sci M—Oct., 1917. Argues that the end of scientific management is socialism.

**Specialization**

Industrial Specialization For a Fighting Army (81450 A). Capt. G. P. Capart. Ills. 2500 w. Ind Man—Oct., 1917. Reviews the efficient work of the engineering and construction forces.

The Technical Side of War (81434 A). 400 w. Ind Man—Oct., 1917. Editorial on Captain Capart's article. Importance of the Am. Elec. War Committee for France.

**Standardization**

The Standardization of Engineering Materials and Its Influence on the Prosperity of the Country (78983 A). John Wolfe Barry. 3500 w. Elec'n—May 11, 1917. Abstract of James Forrest lecture before I. C. E. History and work of the Standards Committee in England.

**Storehouse Methods**

Storehouse Methods That Reduce Labor (76054 A). W. V. C. Bulkeley. Ills. 2200 w. Cas Eng Mthly—Dec., 1916. New system of arranging stock and keeping records.

**Taylor, F. W.**

Tributes to Frederick W. Taylor (74874 B). 15000 w. A S M E—Dec., 1916. Eulogies by prominent men from all over the world.

**Taylor System**

The Taylor System in Franklin Management (74951 A). George D. Babcock. Ills. 7800 w. Ind Man—Dec., 1916. How standards of operation were determined. Fourth article.

La Taylorisation Et Son Application (75568 B). F. Drouhet. 4200 w. Gen Civ—Nov. 25, 1916. How post war conditions may affect application of the system to industries.

The Taylor System In The Franklin Shops (75619 A). Geo. D. Babcock. Ills. 8600 w. Ind Man—Jan., 1917. Determination of individual workmen's wage by formula. Successful results achieved.

The Taylor System in Franklin Management (76349 A). George D. Babcock. 4000 w. Ind Man—Feb., 1917. Sixth article. Changes wrought by scientific knowledge in products, methods, and men.

The Taylor System in Franklin Management (76966 A). George D. Babcock. 4000 w. Seventh and concluding part of a serial dealing with the changes that affect workers brought about by the adoption of the Taylor System.

Application Pratique De La Méthode Taylor (80029 B). P. Negrier. 2000 w. La Nat—July 7, 1917. Application of the Taylor system in a French factory.

Il Sistema Taylor Di Organizzazione Del Lavoro (81376 C + D). G. Pfatisch. 4600 w. Riv Marit—June, 1917. Review of the Taylor System as regards its application in European work shops after the war.

**Time**

Time Utilization vs. Time Saving (80821 A). Walter Logan. 1000 w. Ind Man—Sept., 1917. Efficiency requires not only saving but utilizing time.

**Time Study**

Eliminating Unproductive Time (81447 A). Holden A. Evans. 3000 w. Ind Man—Oct., 1917. Remarkable results from time study of forging operations at the Mare Island Navy Yard.

**Tool Rooms**

Manufacturing Methods Used in Toolroom (77016 A). Illus. 1200 w. Iron Age—March 1, 1917. System at a Cleveland plant which specializes on jigs and fixtures.

Tool Room Systems ((77752 A). Franklin D. Jones. Ills. 20 pp. Machy —April, 1917. Reviews different systems adopted; methods of caring for tools in American plants.

**Topical Discussion**

Topical Discussion of Management (75855 A). 5000 w. A S M E, Jl—Jan., 1917.

**Trade**

How to Appoint Agents For Belgium After the War (80133). O. Knowlton. Ills. 2500 w. Am Mach—July 26, 1917. Suggestions for handling machine tools in that country.

**Trade Unions**

Industrial Evolution After The War (79431). 2600 w. Times Eng Supp—May 25, 1917. Restoration of trade union conditions predicted for the period when peace comes.

See same heading under *Finance and Costs.*

**Wages**

Real Wages in Recent Years (79122 N). F. W. Jones. 12 pp. Am Ec Rev—June, 1917. A critique of Dr. I. M Rubinow's article on "The Recent Trend of Real Wages"

The Application of the Modern Theory of Wages (79320 A). Félix Bayle. 2500 w. Ir & Cl Trds Rev—June 1, 1917. An explanation of Bayle's Scale and its advantages.

Piecework Systems (81177 A). 2200 w. Mech Wld—Aug. 31, 1917. Discusses the three best known systems.

The Fall River Sliding Scale Experiment of 1905-1910 (81158 F). Stanley E. Howard. 22 pp. Am Ec Rev—Sept., 1917. Facts in regard to the industrial situation in the Fall River cotton mills.

See same heading under *Finance and Costs* and under *Regulation.*

**Wage Systems**

La Loi Du 26 Avril 1917 (80021 B). S. Périssé. 5600 w. Gen Civ—June 30, 1917. Critical analysis of a recent French legislative act determining systems of wage payment, bonuses, benefits, etc.

Le Réglement Des Salaires (80710 B). A. Goupil. 4000 w. Gen Civ—July 14, 1917. Wage system in force on the Prussian Hessian state railways before the war. Its economic aspects.

**Wastes**

Conserving 80,000,000 Pounds of Industrial Wastes a Year (80815 A). W. Rockwood Conover. Ills. 3500 w. Ind Man—Sept., 1917. How the General Electric Co. saves more than 40,000 tons of material every year.

Industrial Managers' Greatest Problem—Waste Prevention (80812 A). 3000 w. Ind Man—Sept., 1917. Every waste must be prevented to win the war. Greatest production with fewer workers.

Reclaim All Industrial Waste as a Patriotic Duty (80810 A). Editorial. 1500 w. Ind Man—Sept., 1917. Waste products that must be prevented in order to win the war.

L'Utilization Des Déchets En Allemagne (81400 B). 2500 w. Utilization of wastes in Germany; metals, fuels, foodstuffs, etc.

**Women Workers**

La Question Du Travail Des Femmes (79409 C + D). H. Joly. 7700 w. Soc Enc Ind Nat—Mar.-Apr., 1917. Comprehensive survey of the subject of women in industrial occupations, the effects on the nation today, and problems of the future

Employment of Women in the War Emergency (79543 B). Ills. 2500 w. Ry Age Gaz—June 22, 1917. (Special Number.) Encouraging progress, especially on railways.

Detroit's Plans For Recruiting Women For Industries (80155 A). Harry Franklin Porter. 2500 w. Ind Man—Aug., 1917. Outlines promising and suggestive plans.

Women as Machinists (80154 A). F. R. Still. Ills. 1800 w. Ind Man—Aug., 1917. How women are doing men's work at machine shops, and other activities.

Dilution of Labour (80043). 1000 w. Times Eng Supp—June 29, 1917. Description of exhibition of women's work at industrial centers of England.

How to Deal Successfully With Women in Industry (80757 A). C. B. Lord. Ills. 3000 w. Ind Man—Sept., 1917. Account of how the Wagner Electric Mfg. Co. has solved this problem.

Women in the Machine Shop (81247). Fred H. Colvin. Ills. 4500 w. Am Mach—Sept. 20, 1917. Problems involved, with experiences of some manufacturers.

Women's Munitions Work (82040). 1100 w. Times Eng Supp—Sept. 28, 1917. Exhibition at Sheffield showing war work actually done by women.

**Working Conditions**

Adapting Conditions And Work To Each Other (75612 A). Geo. H. Shepard. 6600 w. Ind Man—Jan., 1917. Application of time studies to improvement of working conditions in factories.

## REGULATION

**Adamson Law**

Developments Regarding the Adamson Law (74967). 1500 w. Ry Rev—Nov. 25, 1916. The first court decision, with text of Judge Hook's decree.

Railroads Ask Injunction Against

Adamson Law (74667). 2500 w. Ry Age Gaz—Nov. 7, 1916. Questions validity of the "eight-hour" law.

The Adamson Law Before the Supreme Court (75926). 3000 w. Ry Age Gaz—Jan. 12, 1917. Government and railroad arguments.

The Adamson Law Held to Be Constitutional (77502). 4500 w. Ry Age Gaz—March 23, 1917. Supreme Court decision that congress has the right to regulate wages.

**Agriculture**

Food and the War (79097 A). Carl W. Larson. 16 pp. Col Univ Qly—June, 1917. Discussion of agricultural production and foreign trade. How to meet food requirements during war.

**California**

Trend of Regulation in California (78533). Max Thelen. 1500 w. Elec Wld—May 5, 1917. Questions involved in San Francisco rate investigations. Past policies to be continued.

**Canada**

Review of the Work of the Commission of Conservation, Canada (78099 N). Clifford Sifton. 14 pp. Can Com Con—1917.

**Chicago**

Unification of Local Governments in Chicago (76832 N). Plates. 92 pp. Chi Bur Pup Eff—Jan., 1917. Report.

**Control**

Government Control of Iron and Steel (80561 A). 1000 w. Iron Age—Aug. 16, 1917. A bill providing for the manufacture and sale.

**Coöperation**

Coöperation in Foreign Trade as Applied to the Power Industry (77771). Ludwig W. Schmidt. 1200 w. Power—April 3, 1917. Outlines methods employed by European nations.

Coöperation of Machine Builders With Woodworkers (80131). John B. Woods. Ills. 2200 w. Am Mach—July 26, 1917. Need of eliminating waste and speeding production.

**Corporations**

Enlarging Field of Holding Companies (77848). Ills. 1500 w. Elec Wld—April 7, 1917. Tendency to engage in independent industrial activities not subject to regulation.

**Drafting Room**

The Engineering Department Modernized (75430 A). H. W. Dunbar and W. E. Freeland. Ills. 2800 w. Iron Age—Dec. 21, 1916. Serial, 1st part. Organization, personnel, and system of a drafting room in Worcester, Mass.

**Eight-Hour Day**

What the Eight-Hour Agitation Means (78098 N). Justus H. Schwacke. 4000 w. Rev—April, 1917. Attempt to present the right point of view.

**Employment**

Employing Men for the Steel Mill (74623 A). A. H. Young. From paper before Nat. Safety Council, at Detroit. 1800 w. Iron Age—Nov. 16, 1916. Methods of Illinois Steel Co. in hiring, keeping records and discharging men.

**Engineers**

Engineers and Organization (78102 A). Ira S. Hollis. 4000 w. La Eng Soc—April, 1917. The value of organization, urging society membership.

The Commercial Engineer (78494 A). George P. Baldwin. 1800 w. Gen Elec Rev—May, 1917. Modern practice of commercial engineering.

The War and the Engineer (79910). E. W. Rice, Jr. 2000 w. Elec Rev West Elec—July 14, 1917. Address before A. I. E. E. on the obligations of engineers.

**Explosives**

Regulation of the Use of Explosives (78645 N). 58 pp. Gov Print Office—1917. Hearings before the committee on mines and mining of the House of Representatives.

To Control and Regulate the Manufacture and Use of Explosives in Time of War (78646 N). 1700 w. Gov Print Office—Report No. 39. Bills submitted to House of Representatives.

**Federal Regulation**

Exclusive Federal Regulation Urged (81294). 7500 w. Ry Age Gaz—Sept. 21, 1917. U. S. Chamber of Commerce Committee favors federal incorporation and control of securities and rates.

**German Commerce**

L'Organisation Scientifique Du Commerce Allemand (75572 B). G. Blondel. 5400 w. Rev Gen Sci—Nov. 30, 1916. Comprehensive review of the plan of organization of German commerce.

**Government Contracts**

Cost-Plus System Severely Criticized (81453 A). 3000 w. Iron Age—Sept. 27, 1917. Modifications may be devised to meet objections.

**Government Ownership**

Government Ownership (75480). F. B. DeBerard. 2500 w. Ry Rev—Dec. 23, 1916. Serial, 1st part. Conditions which preclude efficiency and economy in govermental operation of public utilities.

**Human Factor**

Supreme Court Recognizes Industry's Human Factor (78321 A). Editorial. 1500 w. Ind Man—May, 1917. The cases of the ten-hour law, and minimum wage law of the State of Oregon, and the Adamson law.

**Industrial Machines**

Build Special-Purpose Machines (82088 A). Editorial. 900 w. Ind Man—Nov., 1917. Necessity to offset disadvantages of large numbers of poorly trained employees.

**Industrial Relations**

Organized Labor and Business Must Accept Equal Obligations (76658). Harry A. Wheeler. 2500 w. Eng Rec—Feb. 10, 1917. Public interest can be conserved by meeting inevitable conflict.

The War and Industry (82058 A). James A. Emery. 18 pp. Eff Soc Jl—Oct., 1917. Power of government in relation to industry; restrictive legislation and its effect; national taxation.

The Improvement of Industrial Relations (78774 N). David H. Browne. 2200 w. Can Min Inst, Bul—May, 1917. Causes of industrial discontent.

Labor Disputes and Public Utilities (74930). 4000 w. Elec Ry Jl—Nov. 25, 1916. Reviews addresses before Acad. of Pol. Sci. on government mediation and compulsory arbitration.

Organizing Industrially for War (82099 A). C. E. Knoeppel and G. Sumner Small. 5400 w. Ind Man—Nov., 1917. Changes needed to accomplish results.

Canada's Future—Some Suggestions (76682 N). David H. Browne. 2000 w. Can Min Inst, Bul—Feb., 1917. How cooperation of employer and employees may be secured.

**Industrial Unrest**

Industrial Unrest in Wales and Monmouthshire (80626 A). 6000 w. Colly Gdn—Aug. 3, 1917. From report of commissioners of No. 7 District. Causes and recommendations.

Industrial Unrest Inquiry (80789 A). 3000 w. Engr—Aug. 10, 1917. Outlines results of the various inquiries made in Great Britain.

The Propaganda of Industries (80496 N). T. C. Elder. 2500 w. Beama Jl—July, 1917. Recognition of the value of publicity.

National Industrial Preparedness Memorandum (76666). 3000 w. Can Engr—Feb. 8, 1917. Text of plan submitted by five Canadian Engrs. calling for the formation of a permanent consulting board for supervising industries

**Labor**

Labor's Delusion and Danger (74742 A). 1200 w. Engr—Nov. 3, 1916. Statement of misconceptions that interfere with industrial conciliation.

The Claims of Labor in the Engineering Industry (76143 A). J. R. Richmond. 5800 w. Engng—Jan. 5, 1917. Presidential address to Glasgow Univ. Engng. Soc. (Slightly abridged). Conditions in England discussed.

The Economic Outlook and the Labor Problem (75876 A). F. W. Lanchester. 6000 w. Mech Eng—Dec. 22, 1916. Serial, 1st part. The unsatisfactory attitude of labor in England.

Industrial Democracy With Particular Reference to the Relations Between Capital and Labor (78233 B). George Weston, with discussion. 14000 w. West Soc Engrs, Jl—March, 1917. Fundamentals of harmonious working relations.

Probable Immigration After the War is Over (77834). 2200 w. Ry Age Gaz—April 6, 1917. Predicts a great influx of high-grade labor.

Some Thoughts on the Capital and Labor Problem (78034 A). W. T. Wardale. 2500 w. Elec Rev—March 23, 1917. Difficulties and suggestions for overcoming them.

The Railroads and Their Employes (77905). Charles E. Parks. 4000 w. Ry Rev—April 7, 1917. Analysis of their relationship, with special reference to the public interest.

Co-ordination of Labor a Prime Factor in War (79223). William B. Wilson. 3000 w. Auto—June 14, 1917. Changes must be made gradually. Suggests releasing factory workers to assist in harvesting crops.

Labor Conditions and How Contractors See Them (79605). 2500 w. Eng News-Rec—June 28, 1917. Shortage of supply and shifting of men chief cause of decreasing efficiency.

Female Labor's Place in Automotive Industry (81475). Allen Sinsheimer. Ills. 4000 w. Auto—Sept. 27, 1917. Serial, 1st part. Problems peculiar to female labor to be solved.

Methods of Meeting the Demands for Labor (81883 N). Charles F. Osborn. 10 pp. U S Dept Labor—Sept., 1917. Methods of meeting the emergency arising from war conditions.

The Industrial Disputes Investigation Act of Canada (81880 N). Benjamin M. Squires. 11 pp. U S Dept Labor—Sept., 1917. Act to aid in the prevention and settlement of strikes and lockout in mines and industries connected with public utilities.

**Labor Laws**

Court Decisions on Workmen's Compensation Law, July 1, 1914-Aug. 1, 1916 (78114 N). 400 pp. N Y Dept Labor, Bul—March, 1917. Issued under direction of the Industrial Commission.

Workmen's Compensation Laws of the United States and Foreign Countries (78054 C). 930 pp. U S Dept Labor, Bul 203—Jan., 1917. Summarizes the principle features of legislation enacted in the United States and foreign countries.

New York Labor Laws of 1917 (80487 N). 60 pp. N Y Dept Labor, No. 84—June, 1917. General review.

**Labor Troubles**

Some Observations on Arizona Strikes (81787). Charles F. Willis. 3000 w. Eng & Min Jl—Oct. 13, 1917. Suggestions for the solution of unrest in mining communities.

Why Foreign Miners are Restless (81783). Ellen Phillip Murray. Ills. 1500 w. Cl Age—Oct. 13, 1917. Suggestions for making foreign labor feel at home in this land.

**Law**

Manager and Workmen (74626 A). H. L. Gantt. From address at Springfield, Mass., before the Asso. Ind. 1500 w. Iron Age—Nov. 16, 1916. Lesson of the war.

Solving the Labor Problem in Philadelphia (74407). Thomas Conway, Jr. 5000 w. Elec. Ry Jl—Nov. 4, 1916. Work of Philadelphia Rapid Transit Co.

Some "Inside Workings" of the B. of L. E. (74520). Also editorial. 7000 w. Ry Age Gaz—Nov. 10, 1916. Treatment of members who oppose the organization's legislative plans.

The Human Side of Industry (74960 A). Dr. Otto P. Geier. 1200 w. Sfty Eng—Nov., 1916. Importance of teaching men how to live.

Relation of the Eight-Hour Day to Safety (74958 A). Clarence E. Jackson. 1300 w. Sfty Eng—Nov., 1916. Effect of fatigue and of alcoholic liquors.

Engineering, State, Municipal and Corporate, Involved in the Administration of the Pennsylvania Public Service Company Law (74553 A). F. Herbert Snow. 6500 w. E Cb Phila, Pro—Nov., 1916.

The Extra-Lateral Right—Shall it be Abolished? (74580). William E. Colby. 4000 w. Min & Sci Pr—Nov. 11, 1916. Notes on Spanish laws, also early regulations in Australia, Rhodesia, and British Columbia.

New York State Workmen's Compensation Law, With Amendments, Additions and Annotations to July 1, 1917 (81187 N). 50 pp. N Y Dept Labor—1917.

**Legislation**

The Necessity of Federal Water Legislation (77287 B). Rome G. Brown. 5000 w. Aff Eng Soc Minn, Bul—1916. Urging passage of the Myers bill and the Shields bill.

**Lighting**

See same heading under ELECTRICAL ENGINEERING, *Illumination*.

**Lubricants**

Instructions Allemandes Pour L'Emploi Des Lubrifiants (81388 C + D). M. Goupil. 2100 w. Pont Chaus Ann—May-June, 1917. Abstract of an article in a German periodical giving specifications and rules for the use and conservation of lubricants.

**Machine Numbering**

Machine Numbering Systems (74566 A). 900 w. Mech Wld—Nov. 3, 1916. Importance in schemes of organization.

**Machine Shops**

A Proposed Plan for the Activities of the Machine Shop Practice Sub-Committee of the American Society of Mechanical Engineers (75001 A). H. K. Hathaway. 1200 w. A S M E, Jl—Dec., 1916. Outlines plant. (Abstract.)

**Machine Tools**

Standardization of Machine Tools (76470 A). 2000 w. A S M E, Jl—Feb., 1917. Discussion of Carl G. Barth's paper, with closure.

Standardization of Machine Tools (75000 A). Carl G. Barth. Ills. 2800 w. A S M E, Jl—Dec., 1916. Urges adoption of standards. (Abstract.)

**Metric System**

Shall Great Britain and America Adopt the Metric System? (79089 A). Walter Reuton Ingalls. 7800 w. Instn Min & Met, Bul. 152—May 17, 1917. Arguments against the compulsory adoption. Resulting inconvenience.

**Munitions Makers**

What Is the Matter with the Munitions Makers? (75090). Fred H. Bogart. 5500 w. Machy—Dec., 1916. Faults of organization; lack of co-operation; wage difficulties, etc.

**National Committee**

Comitato Nazionale Scientifico-Tecnico (74878 B). 4500 w. Ind—Oct. 29, 1916. Transactions of Italian National Committee on technical industries.

**Organization**

Functional *versus* Geographical Plan of Organization (74545). T. L. Hinckley. Diagrams. 1800 w. Can Engr—Nov. 9, 1916. With particular reference to street cleaning departments.

Principles of Industrial Organization (74596 A). H. N. Stronck. 6000 w. Met & Chem Eng—Nov. 15, 1916. Principles and application to chemical industry.

Railway Engineering Organization and Some Comments on Railway Capitalization (74347 A). V. K. Hendricks. 2500 w. E Cb St. L, Jl—Sept.-Oct., 1916. The function of the engineer; rates, etc.

Speeding Up in an Engineering Factory (74777 A). R. Rankin. Read before Jun. Inst. of Engrs. 7500 w. Cas Eng Mthly—Nov., 1916. Effects of reorganization of wages-payment on the cost of production.

Works Organization (74479 N). A. D. C. Parsons, Edwin L. Orde, and G. H. Tweddell. 14000 w. N E C Instn—Oct., 1916. Considers manufacturing, costing and selling of the works product.

Organization of Iron, Steel, Engineering, Shipbuilding, and Allied Industries (75657 A). 2500 w. Engr—Dec. 15, 1916. Account of an important meeting at Glasgow, and its object.

Works Organization (79090 N). A. W. Reeves and Cecil Kimber. 13 plates. 18 pp. Instn Aut Engrs—May, 1917. A series of rules and regulations for guiding operators concerned in the production of an engineering commodity.

Stores Organization (79939 A). P. J. Sims. Read before Assn. of Min. Elec. Engrs. 4000 w. Mech Wld—June 29, 1917. Discusses buying, the stock and statistical routine.

**Patents**

Des Modifications A Apporter A La Loi Sur Les Brevets D'Invention (78300 B). A. Taillefer. 4500 w. La Nat—Apr. 7, 1917. Historical review and present status of French patent law.

A Few Patent Points, With Some Applications to Alloy Patents (81427 N). William J. Rich. 3300 w. A I Mt, Jl—June, 1917. Features of patent practice.

Patents and the Manufacturer (81687). Glenn B. Harris. 2000 w. Am Mach—Oct. 11, 1917. Ideas of benefit to executives and manufacturers.

**Publicity**

What a Publicity Bureau Could Do (80598). Ivy L. Lee. 2500 w. Elec Ry Jl—Aug. 18, 1917. Need of its service in helping the public to understand the electric railway situation.

Engineering Publicity (81828 A). D. Ross Kennedy. 2000 w. Elec Rev—Sept. 14, 1917. Outlines the work of a modern publicity department.

**Public Service**

Public School Regulation (74635 B). J. L. Schley. 6500 w. Prof Mem—Nov.-Dec., 1916. Reviews the history of regulation and the functions performed.

Public-Service Regulation (80635 D). Thomas W. D. Worthen, with discussion. 32 pp. N E W-Wks Assn, Jl—June, 1917. The work of commissioners in the regulation of public utilities, rates, etc.

**Public Utilities**

A Method of Determining a Reasonable Service Rate for Municipally Owned Public Utilities (74794 D). 2500 w. A S C E, Pro—Nov., 1916. Discussion of J. B. Lippincott's paper.

Consolidated Stock Not Limited by Fair Value (74406). 3000 w. Elec Ry Jl—Nov. 4, 1916. Recent decision of the Illinois Public Utilities Commission.

Growth and Depreciation (74678 D). Julian Loebenstein. 18 pp. A I E E, Pro—Nov., 1916. Five points of importance are considered and arguments given.

Is Utility Regulation on the Right Basis? (74410). J. D. Galloway. 5000 w. Eng Rec—Nov. 4, 1916. Competition needed instead of protected monopoly.

Public-Utility Commissions Should Regulate, Not Operate, Corporations (74535). Leonard Metcalf. Read before Am. Water-Works Assn. 5000 w. Eng Rec—Nov. 11, 1916. Basis of control.

Rewarding Ably-Managed Public Utilities (74402). Samuel W. Fleming, Jr. 1500 w. Elec Wld—Nov. 4, 1916. Plans for bringing out efficiency in central station management.

A Method of Determining a Reasonable Service Rate for Municipally Owned Public Utilities (76070 D). 3000 w. A S C E, Pro—Dec., 1916. Continued discussion of J. B. Lippincott's paper.

A Method of Determining a Reasonable Service Rate for Municipally Owned Public Utilities (76296 D). 8 pp. A S C E, Pro—Jan., 1917. Continued discussion of J. B. Lippincott's paper.

Effect of Local Conditions on Utilities (76357). Peter Junkersfeld. From paper before Indiana Engng. Soc. 1500 w. Elec Rv & Wes Elec—Jan. 27, 1917. Facts and factors of Edison service in Chicago.

Origin and Status of Utility Regulation (75837). Thomas Robson Hay. 5500 w. Elec Rv & Wes Elec—Jan. 13, 1917. Causes which lead to public service regulation, with suggestions.

Regulating $5,313,000,000 of Utilities (75678). Ills. 5000 w. Elec Ry Jl—Dec. 30, 1916. Working of regulatory machinery.

Should Utah Have a Public Utilities Commission? (76166). Affirmative address by Frank Evans, negative address by L. B. Wight. 3000 w. Utah Soc Engrs—Dec., 1916.

The Public and Public Utilities (76048 A). Edmund W. Wakelee. 8 pp. A E R A—Dec., 1916. Relations and means of maintaining them.

How a Commission Works (76497). 6500 w. Elec Ry Jl—Feb. 3, 1917. Concludes the story of the Public Service Commission for the Second District of New York.

Relation of Public Utilities to the Public (78234 B). W. W. Freeman, with discussion. 11000 w. West Soc Engrs, Jl—March, 1917. Outlines axiomatic principles, and the conditions which should be guaranteed to public utilities.

The Limitations of Public Ownership (78001). Thomas R. Hay. 2200 w. Elec Ry & Wes Elec—April 14, 1917. Objections to municipal ownership.

The Control and Regulation of Public Utilities (78816 A). T. J. Strickler. 1600 w. Kan Engr—1916-17. Recognized general principles governing such control.

Laws and Supreme Court Decisions Affecting Utility Companies (78541). E. C. Melby. 2000 w. Elec Rev & Wes Elec —May 5, 1917. Few of the more important state laws and court decisions.

A Method of Determining a Reasonable Service Rate For Municipally Owned Public Utilities (80659 D). 1000 w. A S C E, Pro—Aug., 1917. Discussion of J. B. Lippincott's paper.

The War's Effect on Public Utilities (80230 A). Henry G. Bradlee. 3000 w. Gen Elec Rev—Aug., 1917. Conditions that must be met, suggesting means of relief.

What Is a "Fair Return" for Public Utilities? (80681). William G. Raymond. 4500 w. Ry Age Gaz—Aug. 24, 1917. The right to earn a reasonable profit is discussed.

Shall Municipalities Own Their Utilities?—Discussion (81451 A). Francis W. Collins. 400 w. Ind Man—Oct., 1917. Short discussion of A. G. Christie's article in the August issue.

The Early Regulation of Public Service Corporations (81160 F). M. H. Hunter. 12 pp. Am Ec Rev—Sept., 1917. Forms of regulation for supervising franchises and officers, valuation and rates, security issues, service and property, accounts, etc.

**Public Works**

A National Department of Public Works Our Nation's Need (75344 B). Isham Randolph. 4000 w. Fkn Inst, Jl—Dec., 1916. Presents a suggested bill for the creation of a new department of government.

**Railroad Lawmaking**

Taking Railroad Lawmaking by the Forelock (79741). Howard Elliott. 1500 w. Ry Age Gaz—July 6, 1917. Incessant educational campaign necessary.

**Railway Regulation**

Railroad Credit and the Success of Regulation (74383). A. J. County. 3500 w. Ry Age Gaz—Nov. 3, 1916. From address before Phila. Credit Men's Assn. The scope of suggested national regulation.

Railway Regulation and Its Effect on the War (79545 B). 5000 w. Ry Age Gaz—June 22, 1917. (Special No.) Defects in the present system and need for radical changes.

Congressional Inquiry on Railroad Regulation (74820). 4000 w. Ry Age Gaz—Nov. 24, 1916. Outlines the scope of the inquiry, and gives organizations represented.

The Congressional Inquiry Into Railway Regulation (74966). 2500 w. Ry Rev—Nov. 25, 1916. Proceedings of Newlands Joint Committee.

The Need for Better Regulation (74669). Frank Trumbull. Address to Nat. Ind. Traffic League, Chicago. 2000 w. Ry Age Gaz—Nov. 17, 1916.

Congressional Inquiry on Railroad Regulation (75023). Also editorial. 8000 w. Ry Age Gaz—Dec. 1, 1916. Statement by Alfred P. Thom, Counsel for Ry. Ex. Adv. Co.

Congressional Inquiry on Railroad Regulation (75148). 5000 w. Ry Age Gaz—Dec. 8, 1916. Cross-examination of Alfred P. Thom by the Newlands Joint Committee.

Congressional Inquiry on Railroad Regulation (75330). 3500 w. Ry Age Gaz—Dec. 15, 1916. Newlands Committee concludes hearings for the present.

**Rates**

Status of Government Rate Regulation (77874). Morton G. Lloyd. 1500 w. Elec Rv & Wes Elec—April 7, 1917. What constitutes the legal basis for government regulation of rates.

**Regulation**

Congressional Inquiry on Railroad Regulation (77498). R. S. Lovett (Abstract). 8000 w. Ry Age Gaz—March 23, 1917. Serial. 1st part. Hearings before Congressional Committee on Interstate Commerce.

Our Railway and Public Utilities Regulators (77694). Francis W. Lane. 4500 w. Ry Age Gaz—March 30, 1917. Mode of selection, compensation and term of service of state commissioners.

**Russia**

Russian Industrial Progress in War Time (75431 A). Sterling H. Bunnell. Ills. 1500 w. Iron Age—Dec. 21, 1916. War organization of industry.

**Shipping**

The War and Trans-Pacific Shipping (81159 F). Abraham Berglund. 15 pp. Am Ec Rev—Sept., 1917. Causes of high freight rates; the carrying trade; effect of war on industries, etc.

**Standardization**

Standardization and Its Assistance to the Engineering Industries (74299 A). C. Le Maistre, with editorial. 4500 w. Elec'n—Oct. 13, 1916. Read before the British Assn. The work of the British Engng. Standards Committee.

Standards Will Shorten War (79613). A. Ludlow Clayden. 1500 w. Auto—June

28, 1917. Only standardization makes possible vast supplies.

**Steel Control**

Hearing on Federal Control of Steel (81454 A). 8500 w. Iron Age—Sept. 27, 1917. Chairman Davies suggests suspending or canceling existing contracts.

**Steel Prices**

Steel Prices Are Fixed by Agreement (81455 A). 5000 w. Iron Age—Sept. 27, 1917. Government, allies, and the public put on the same basis. Also editorial.

**Steel Syndicate**

The German Steel Syndicate (78675 A). W. J. Ashley, with short discussion. 2500 w. Ir & Cl Trds Rev—April 27, 1917. Considers the subject with reference to the future British policy.

**Strike Averted**

Railroad Managers Grant Demands of Trainmen (77501). 2500 w. Ry Age Gaz —March 23, 1917. Strike averted. Ten hours' pay for eight hours' work.

**Taxation**

The Taxation of Steam Railroad Corporation Property (79900). A. I. Totten. 1500 w. Ry Rev—July 14, 1917. Serial, 1st part. Suggestions for a new and equitable system.

**Telephone**

Telephone Regulation in Minnesota (76884). 1500 w. Telephony—Feb. 24, 1917. Reviews work of Minn. R. R. & Warehouse Commission.

**Timber**

The Taxation of Timber Lands in Pennsylvania (78932 A). S. B. Elliott. Ills. 1800 w. Engr Soc of Penn, Jl—Nov.-Dec., 1916. Discussion of the justness.

**Trade**

Two Views of the German Cartel (77921 A). 6500 w. Ir & Cl Trds Rev—March 16, 1917. Translated extracts from a book issued by the German Ironmasters' Assn. A defense of the cartel system, etc.

The Organization of Trades (76690 A). E. J. P. Benn. Also editorial and short discussion. 4500 w. Elec'n—Jan. 26, 1917. Lecture before London School of Economics.

**Wage**

Some Phases of the Minimum Wage Question (78067 N). James E. Le Rossignol, with discussion. 31 pp. Am Ec Rev—March, 1917. Discusses wage regulation by law.

**Wages**

Wages for Ability, Output and Service (79701 A). W. E. Freeland. Ills. 2200 w. Iron Age—June 28, 1917. Maxi-Pay wage plan, production bonus, bonus for steady employment and group insurance. Bullard plant, Bridgeport, Conn.

**War Problems**

The Need For Greater Publicity on Matters Concerning the War (79683 A). 2000 w. Gen Elec Rev—July, 1917. Facts bearing upon the situation.

**Water Legislation**

Necessity of Federal Water Legislation (74866 C). R. G. Brown. 6000 w. C E Soc St P—Oct. 9, 1916. Review of existing situation. Suggestions.

**Water Power**

Follies of the Ferris Bill (78027). Reed Smoot. 2500 w. Power—April 17, 1917. Opinions of the water-power interests of the West. Proposes state control. Probable results.

Loi Fédérale sur l'utilisation des Forces Hydrauliques (78268 B). 5000 w. Schweiz Elek Ver Bul—Feb., 1917. Swiss law governing utilization of water powers.

Water Power Development (78026). Franklin K. Lane. Ills. 4000 w. Power —April 17, 1917. The Government's attitude in the water power controversy.

# WELFARE AND SAFETY

**Accidents**

Prevention of Mine Accidents (74417). F. W. Sperr. 1700 w. Cl Age—Nov. 4, 1916. Causes and prevention.

Relative Importance of Accident Causes in Industries (74959 A). E. H. Downey. 1200 w. Sfty Eng—Nov., 1916. Outlines method of schedule rating.

Accident Prevention (76639 A). Marcus A. Dowd, with discussion. 35 pp. N Y Rd Cb Pro—Jan. 19, 1917. Causes and prevention methods on railroads.

An Accident Prevention Program (77611 A). Harry A. Bullock. 3000 w. A E R A—March, 1917. Plans for cooperation between Claims-Transportation Committee and National Safety Council.

Industrial Accident Prevention (77682 A). L. A. Beagle. 3000 w. Sfty Eng—March, 1917. Suggestions.

Metal-Mine Accidents in the United States During the Calendar Year 1915 (77263). Albert H. Fay. 100 pp. U S Bur Mines—Tech paper 168. Statistics.

Accidents in Refrigerating Plants (78092 B). John E. Starr, with discussion. 10 pp. A S R E, Jl—March, 1917. Accidents resulting from rupture or break in refrigerating machinery.

Cause and Prevention of Industrial Casualty (78322 A). H. Weaver Mowery. Ills. 4500 w. Ind Man—May, 1917. Suggestions for reducing casualties among employees.

Fatal Accidents Due to Falls in Building Work, Their Frequency, Causes, and Prevention (78115 N). 22 pp. N Y Dept Labor, Bul—March, 1917. Issued under direction of the Industrial Commission, State of New York.

How to Reduce Accidents in Mines (78231 A). E. C. Lee. 1800 w. Sfty Eng—April, 1917. Serial 1st part. Suggestions for safety.

Recording of Accidents, and Safety Measures Employed by the New Jersey Zinc Co. (77888). Benjamin F. Tillson. 5800 w. Eng & Min Jl—April 7, 1917. Methods used for collecting data and decreasing accidents.

Accidents on Construction (79140). J. J. Rosenthal. Ills. 1500 w. Eng News-Rec—June 7, 1917. What they cost and how to prevent them.

Engineering Revision Lessens Accidents (81075). 2500 w. Iron Age—Sept. 13, 1917. Digest of a paper by Lucian W. Chaney before the Internat. Assn. of Ind. Accident Boards and Commissions. Discusses accident rates in the iron and steel industry.

Accidents Due to the Use of Tools and Machinery (81744 A). David Moore. 3000 w. Sfty Eng—Sept., 1917. Confined to the railroad industry.

Accident Prevention in the Electrical Field (81746 A). W. C. Pearce. 3000 w. Sfty Eng—Sept., 1917. Suggestions for promoting safety in the work.

First Aid—Accident Prevention (81745 A). J. R. Mulligan. 2500 w. Sfty Eng—Sept., 1917. Training in this work at Bethlehem, Pa.

The Progress and Possibilities of Accident Prevention Work (81743 A). Marcus A. Dow. 2000 w. Sfty Eng—Sept., 1917. Benefits from the work, especially the work of the U. S. Steel Corporation at its various plants.

**Artificial Hands**

Mains Artificielles Pour Amputés (76243 B). Ills. 3200 w. Gen Civ—Dec. 30, 1916. New devices for those who have lost hands or arms.

**Asphyxiation**

Asphyxiation From Blast Furnace Gas (78246). Frederick H. Willcox. Ills. 60 pp. U S Bur Mines—Tech paper 106. Nature and cause of poisoning and precautions that should be taken.

**Athletics**

See Recreation.

**Belgian Relief**

Mining Engineers and Belgian Relief (78417). Ills. 1200 w. Min & Sci Pr—April 28, 1917. Account of the work.

The Commission for Relief in Belgium (76107). William L. Honnold. 4000 w. Eng & Min Jl—Jan. 20, 1917. Work headed by American mining engineers to prevent starvation.

**Canteens**

Canteens at Munitions Works (81862 A). Ills. 800 w. Engr—Sept. 28, 1917. Industrial canteens and their cooking and heating apparatus.

**Child Mortality**

Child Mortality in the Coal Fields (78571 A). 2000 w. Colly Gdn—April 13, 1917. Report by the medical officer of the Local Government Board on child mortality in England and Wales.

**Coke Ovens**

Safety Around Coke Ovens (74624 A). Kenneth M. Burr. 1200 w. Iron Age—Nov. 16, 1916. Mechanical safeguards, careful selection of men, and education necessary.

**Coöperation**

Financial Aids for Employees (81439 A). W. L. Chandler. 4500 w. Ind Man—Oct., 1917. Encouraging workers to save. Successful methods in coöperative buying, in housing, managing benefit associations, etc.

**Cranes**

Proposed Code of Safety Standards for Operation of Cranes (74324 A). 2500 w. A S M E, Jl—Nov., 1916. Code for safeguarding industrial risks.

**Cripples**

Orientation Professionnelle Des Blessés (74899 B). P. Razous. Ills. 5600 w. Gen Civ—Oct. 28, 1916. Account of what the French are doing to teach those injured and crippled some form of manual labor.

L'Évaluation Scientifique Des Pensions Et Indemnités (80746 B). Ills. 1400 w. Lat Nat—July 28, 1917. Scientific methods and apparatus for determining the fitness and usefulness of men incapacitated by war.

**Dust**

The Menace of the Dusty Trades (81235 A). W. Gilman Thompson. 2500 w. Am Jl Pub Hh—Sept., 1917. Suggestions for protecting workers' health.

**Economics**

The Economic Saving of Human Resources (78387 A). C. L. Close. 4000 w. Sci M—May, 1917. The work of the United States Steel Corporation.

**Electrical Code**

National Electrical Safety Code, for Examination, Trial, and Constructive Criticism (74768 A). 320 pp. U S Bur Stds, Circ 54—Nov. 15, 1916.

**Electrical Equipment**

Safeguarding Electrical Equipment (81266 N). Walter Greenwood. 3000 w. Assn I S E E—Sept., 1917. Urging the

Association to declare authoritatively on five important matters.

**Employees**

Specifications for Railway Employes (77610 A). Charles H. Lemon. 3500 w. A E R A—March, 1917. Value of physically fit men in modern traction organizations.

See same heading under *Management.*

**Exhaust Gas**

Gasoline Engine Exhaust Gas Poisoning (80763 A). R. P. Albaugh. 1000 w. Am Jl Pub Hh—Aug., 1917. Cites instances of gas-poisoning and the importance of ventilation.

**Eye Protection**

Glasses for Protecting the Eyes from Injurious Radiations (78739). W. W. Coblentz. 14 pp. U S Bur Stds, Tech paper 93—May 5, 1917. Investigates the protective characteristics of glasses available for protecting the eyes.

**Fatigue**

Industrial Fatigue (74885). 3300 w. Times Eng Supp—Oct. 27, 1916. Present status of the subject in Great Britain.

Industrial Fatigue (77578). 2000 w. Times Eng Supp—Feb. 23, 1917. Practical problems of control, methods of investigation, etc.

Hours of Labour (82033). 2400 w. Times Eng Supp—Sept. 28, 1917. Comprehensive review of the relation of industrial fatigue and shop output.

Sui Limiti Della Fatica Industriale (82005 B). R. Cormio. Ills. 1500 w. Mon Tec—Aug. 10, 1917. A study of the limits and effects of industrial fatigue.

**Fire Hazards**

Electrical Fire Hazards (81749 A). Edward F. Croker. 1500 w. Sfty Eng—Sept., 1917. Third of a series of articles on fire prevention, hazards, extinguishing, etc.

**Fire Menace**

The Fire Menace of Railroads (76417 A). Alexander Brociner. From a paper read before the Nat. Fire Protec. Assn. 3500 w. Sfty Eng—Jan., 1917. Fire hazards and regulations needed.

**Fire Prevention**

Safeguarding Industry: A War-time Necessity (81137 A). Ills. 7500 w. Sfty Eng—Aug., 1917. Prepared for the Council of National Defense by the National Board of Fire Underwriters.

**First Aid**

Elementary First Aid for the Miner (76000 N). W. A. Lynott and D. Harrington. Ills. 16 pp. U S Bur Mines—Miners' Circ. 23. Treats only of the simplest first aid needs.

**Food Waste**

Conserving the Food Supply (80071). Herbert C. Hoover. 2500 w. Eng & Min Jl—July 21, 1917. Address at Washington, D. C., explaining existing conditions in the U. S.

**Forest-Fire**

A New Forest-Fire Lookout Map (77076 A). Emanuel Fritz. Illus. 2200 w. Sib Jl Eng—March, 1917. Relief map and its use is explained.

**Foundries**

Practical Welfare Work in Foundries (81284 A). S. W. Ashe. Ills. 1800 w. Iron Age—Sept. 20, 1917. Developing better personal relations between employer and employee.

**Fumes**

Fume Poisoning from Nitric and Mixed Acid (74961 A). L. A. De Blois. 1000 w. Sfty Eng—Nov., 1916. Nitrous fumes and their effects.

**Grinding**

Safety in Cutlery Grinding (81748 A). Earl B. Morgan. Ills. 1800 w. Sfty Eng—Sept., 1917. Protective measures and operating suggestions.

**Grinding Wheels**

Stresses in Grinding Wheels (76416 A). S. V. James. 2000 w. Sfty Eng—Jan., 1917. Formulas evolved and applied.

**Guards**

Guards for Wood-Working Machinery (77417 A). Ills. 1500 w. Engng—March 2, 1917. Causes of accidents and safety guards now used.

**Handling**

Handling of Materials (81742 A). G. A. Orth. 4000 w. Sfty Eng—Sept., 1917. Crane and chain practices, electric trucks, etc.

**Health Conservation**

Medical, Hospital, and Surgical Treatment for Employees (81882 N). Anice L. Whitney. 8 pp. U S Dept Labor—Sept., 1917. Methods of caring for the health of employees.

**Highway Safety**

Increasing the Safety of Our Highways (78416). W. H. Losee. Read before conference at Toronto. Ills. 3500 w. Can Engr—April 26, 1917. Problems due to growing traffic and increased speed.

**Hoods**

Hoods For Removing Dust, Fumes and Gases (80486 N). Ills. 21 pp. N Y Dept Labor, No. 82—May, 1917. Conditions affecting their efficiency.

**Housing**

La Tache Sociale De L'Industriel (76913 C + D). F. Villain. Ills. 8500 w. Soc Enc Ind Nat—Nov. 11, 1916. How housing, sanitation and other environment of work people has been improved in Lorraine.

**Human Potential**

See same heading under *Management.*

**Industrial Hygiene**

Hygienic and Sanitary Equipment (81437 A). John Roach. 5500 w. Ind Man—Oct., 1917. Economic benefits from safe and comfortable premises; requirements and standards.

Health of the Working Force (81436 A). Dr. Otto P. Geier. 3500 w. Ind Man—Oct., 1917. Responsibility of employers for the health of employees.

Hygiene of the Printing Trades (81162 A). Alice Hamilton and Charles H. Verrill. 114 pp. U S Dept Labor, No. 209 —April, 1917. A study of the influence of lead and other substances upon the health of men in the printing trade.

Relation of the Public Health Service to Problems of Industrial Hygiene (81237 A). J. W. Kerr. 3300 w. Am Jl Pub Hh—Sept., 1917. Outlines the many problems to be solved, the functions of public service, etc.

**Industrial Poisons**

Industrial Poisons in Munition Plants (79606). Gertrude Seymour. 2500 w. Survey—June 30, 1917. Information from Bul. 219 of U. S. Bureau of Labor.

Carbon Monoxide Poisoning in the Steel Industry (80533). J. A. Watkins. 12 pp. U S Bur Mines—Tech paper 156. Liability to poisoning in the steel plant; source and extent of the gas; effect, etc.

**Industrial Work**

Boston Settlements Organize Industrial Relations Work (81087). Ills. 1500 w. Auto—Sept. 13, 1917. Neighborhood houses, independent of factory or employees, provide recreation, encourage health and sanitary measures.

**Insurance**

Compulsory Health Insurance in Industry (78245 A). Magnus W. Alexander. 3500 w. Iron Age—April 26, 1917. Extracts from statements presented at legislative hearings in New York and Massachusetts.

**Labor**

Employing Methods That Make Good Workers (76180 A). R. T. Kent. 2500 w. Cas Eng Mthly—Jan., 1917. Effect of supervision of the health of workmen.

**Labor Insurance**

Group Insurance for Lime Manufacturers (80857 N). Joseph A. Peck. 2000 w. Nat'l Lime Mfr Assn—June, 1917. Explains plan and outlines its purposes.

**Labor Saving**

See same heading under *Management.*

**Laws**

Workmen's Compensation Acts (78954 A). Chesla C. Sherlock. 2200 w. Machy —June, 1917. Laws governing industrial conditions.

**Locomotive Engineers**

Hazards of Locomotive Engineers (78232 A). Frederick S. Crum. 2200 w. Sfty Eng—April, 1917. Duties, diseases and dangers.

**Manufacturing**

Life in a Large Manufacturing Plant (80236 A). Ills. 4000 w. Gen Elec Rev —Aug., 1917. Serial, 1st part. Details of plans for the selection of an efficient working force and the maintenance of the high standard.

**Mine Accidents**

Disregard of Danger the Cause of Mountain King Fatalities (79271). Lewis H. Eddy. 1500 w. Eng & Min Jl—June 16, 1917. Accident in California mine believed to be due to the prevailing belief that men can live where an open light can burn.

How Best to Eliminate the Bigger Mine Accidents (79260). Frank Haas. Ills. 2000 w. Cl Age—June 16, 1917. Accidents caused by gas, coal dust, and mine fires.

**Miners' Phthisis**

Silicosis in Rats in a Witwaters-rand Mine (79024 N). J. Pratt Johnson, with discussion. Ills. 5000 w. Chem, Met, & Min Soc of S Af, Jl—March, 1917. Research work.

**Mine Rescue Cars**

The Mine Rescue Cars of the Government (81747 A). D. J. Parker. 2000 w. Sfty Eng—Sept., 1917. Details of their equipment and use.

**Munitions**

Munition-Plant Poisons (77677 A). Archie Rice. Ills. 2500 w. Am Jl Pub Hh—March, 1917. Experience with trinitrololuol dust, and other poisons.

**Munition Workers**

Hours, Fatigue, and Health in British Munition Factories (78643). 142 pp. U S Dept Labor—No. 221. Reprints of the memoranda of the British Health of Munition Workers Committee.

Output And Hours Of Work (75579). 1700 w. Times Eng Supp—Nov. 24, 1916. Report on conditions and effect on health of operatives in munitions factories. Results of observations in England.

**Occupational Diseases**

Bureau of Mines' Studies of Occupational Diseases (74458 B). Dr. W. A. Lynott. 3000 w. Jl Ind & Eng Chem—Nov., 1916. Results of investigations.

Dangers Other Than Accidents in the Manufacture of Explosives (74459 B). Dr. Alice Hamilton. 3000 w. Jl Ind & Eng Chem—Nov., 1916. Study of occupational poisoning in munition factories.

Industrial Poisoning from Aniline and Allied Products (74457 B). George P. Adamson. 4000 w. Jl Ind & Eng Chem—Nov., 1916. Symptoms, treatment, etc.

Miners' Phthisis Prevention (74702). A. Cooper Key. 2500 w. Eng & Min Jl—Nov. 18, 1916. Statement of four years' work of committee.

Occupational Diseases in the Chemical Trades (74455 B). Charles Baskerville. 1200 w. Jl Ind & Eng Chem—Nov., 1916. Objects of committee appointed by the N. Y. section of the Am. Chem. Soc.

The Occupational Hazard in the Chemical Industry: the Need for Prophylaxis (74456 B). J. W. Schereschewsky. 4500 w. Jl Ind & Eng Chem—Nov., 1916. Outlines main hazards to health.

Anthrax as an Occupational Disease (77959 A). John B. Andrews. Ills. 150 pp. U S Dept Labor, No. 205—Jan., 1917. Description and history of this disease, with suggestions and recommendations for its control.

Causes of Death by Occupation (78644). Louis I. Dublin. 80 pp. U S Dept Labor—No. 207. Experience of the Metropolitan Life Insurance Co.

**Occupational Poisoning**

Dope Poisoning in the Manufacture of Airplane Wings (81965 N). Alice Hamilton. 4000 w. U S Dept Labor—Oct., 1917. Dangers in the preparation of the linens used.

**Paris Green**

Dangers in Manufacture of Paris Green and Scheele's Green (80488 N). Ills. 15 pp. N Y Dept Labor No. 83—July, 1917. Physical properties and dangers.

**Personnel Work**

Increasing Dividends Through Personnel Work (81591 D). Thomas T. Read. 15 pp. A I M E, Bul—Oct., 1917. Accident and illness prevention, labor turnover and its reduction, welfare work, educational work, etc.

**Quarry Accidents**

Quarry Accidents in the United States During the Calendar Year 1915 (76558). Albert H. Fay. 70 pp. U S Bur Mines—Tech paper 165.

Accident Prevention in Quarrying (78698). From the *Travelers Standard*. 2200 w. Eng & Con—May 16, 1917. Outlines prevention measures.

**Railways**

Railway Safety (76306 A). H. J. Bell, with discussion. Ills. 25 pp. West Ry Cb—Nov. 20, 1916. Outline of what the Chicago & North Western Ry. has done in safety organizations.

**Recreation**

Recreation of the Working Force (81442 A). Mary Barnett Gilson. Ills. 2200 w. Ind Man—Oct., 1917. Experience of the Clothcraft Shops in Cleveland, O., with systematic recreation.

Athletics For the Working Force (81440 A). C. B. Lord. Ills. 1800 w. Ind Man—Oct., 1917. Describes plan of Wagner Elec. Mfg. Co. in promoting athletics and the beneficial effects.

**Refrigeration**

Safety in Refrigerating Plants (79055 A). George P. Carroll. 3500 w. Ice & Refrig—June, 1917. Criticism of New York regulations for safety in operation.

**Report**

Report of the Secretary of the Committee on Safety and Sanitation (76194 D). 35 pp. A I M E, Bul—Jan., 1917. Classified synopsis of the data collected.

**Rescue Apparatus**

Notes on Mine Rescue Apparatus and the Training of Men in Its Use (74653). James M. Stewart. 1000 w. Can Min Inst, Bul—Nov., 1916. Comparisons of two types.

Testing Mine Rescue Apparatus (74838). C. E. Pettibone. Ills. 1500 w. Cl Age—Nov. 25, 1916. Experiments. Test described.

Oxygen Mine Rescue Apparatus and Physcological Effects on Users (78095). Yandell Henderson and James W. Paul. Ills. 83 pp. U S Bur Mines—Tech paper 82. Importance, types, requirements, results of tests, etc.

Rescue Apparatus in Mines (80087 A). Ills. 3500 w. Engng—July 6, 1917. Reviews report of Yandell Henderson and James W. Paul issued by U. S. Government.

Use and Testing of Oxygen Mine-Rescue Apparatus (80612). Ills. 1500 w. Min & Sci Pr—Aug. 18, 1917. Defects of apparatus and remedies.

**Rescue Stations**

Equipment and Organization of Mine Rescue Stations (81784). A. J. Moorshead. Ills. 3000 w. Cl Age—Oct. 13, 1917. Equipment necessary; organizing rescue teams, etc.

**Restaurant**

Une Cantine Électrique Originale Dans Une Usine Francaise (81407 B). J. Boyer. Ills. 1400 w. La Nat—Sept. 8, 1917. Methods and appliances for a restaurant in a large French industrial establishment.

**Resuscitation**

Resuscitation From Mine Gases (77014 A). Frederick P. Mills, with discussion. Ills. 4500 w. Ir & Cl Trds Rev—Feb. 9, 1917. Read before Nat. Assn. of Colly-Mgrs. Types of mechanical breathing apparatus and methods of resuscitation.

**Risk**

The Assumption of Risk (77066 A). Chesla C. Sherlock. 1300 w. Machy—March, 1917. Principles of law that govern cases.

**Rolling Mills**

Safety in Rolling Mill Operation (74962 A). Charles R. Hook. 1000 w. Sfty Eng—Nov., 1916. Factors determining the success.

**Safety**

Making Carelessness Impossible (75196). Joseph Knapper. 2200 w. Cl Age—Dec. 9, 1916. Presidential address to Coal Mining Inst. of America.

Relation of Industrial Lighting to Safety (79265). C. E. Clewell. Ills. 2000 w. Elec Wld—June 16, 1917. Examples of accidents caused by improper illumination.

Report of the Secretary of the Committee on Safety and Sanitation (79157 D). 12 pp. A I M E, Bul—June, 1917. Discussion of E. Maltby Shipp's paper.

Industrial Safety Session (79679 A). 4500 w. A S M E, Jl—July, 1917. Discussion of safety standards for many industries.

Practical Aspects of the Safety Movement (81438 A). Arthur H. Young. 3000 w. Ind Man—Oct., 1917. Activities of the safety movement. What has been accomplished.

Safety Engineering at the Winchester Repeating Arms Company (81568). C. B. Hayward. Ills. 2500 w. Am Mach—Oct. 4, 1917. Outline of the principles and routine work of this branch.

Notes on the Suggested Safety Rules for Installing and Using Electrical Plant in American Coal Mines (81964 A). L. Fokes. 3200 w. Ir & Cl Trds Rev—Oct. 5, 1917. Critical review of suggested rules.

Training Foundry Foremen for Cooperation in Safety Work (81741 A). W. E. Watters. 3500 w. Sfty Eng—Sept., 1917. Qualities desirable in foremen for securing satisfactory results.

**Safety Appliances**

The Safety Appliance Standards (79892 A). Hiram W. Belnap. Ills. 4500 w. Ry Mech Engr—July, 1917. Reasons for the selection of fixed dimensions and locations.

**Safety Code**

Proposed Safety Code for Ohio Industries (79219 A). 2500 w. Iron Age—June 14, 1917. To be used in conjunction with steel works and foundry codes.

**Safety Hints**

Hints for Industrial Safety Work (77294 A). F. M. Coffey. 2000 w. Sfty Eng—Feb., 1917.

**Safety Rules**

Tentative Safety Rules for Gold Dredges in California (80910). 5500 w. Eng & Min Jl—Sept. 1, 1917. Regulations prepared by a group of experts.

**Safety Standards**

Tentative Draft of a Code of Safety Standards for Power-Transmission Machinery (79082 A). Compiled by Carl M. Hansen and Rufus W. Hicks. Ills. 2000 w. A S M E, Jl—June, 1917. Rules and requirements for the protection of industrial workers.

**Safety Work**

Safety Work in Ontario Mines (77539). James Bartlett. 2200 w. Cl Age—March 24, 1917. Shows interest in mine safety movement in Canada.

Organizing and Conducting Safety Work in Mines (79817 A). Herbert M. Wilson and James R. Fleming. Ills. 50 pp. U S Bur Mines—Tech paper 103. Means adopted for promoting greater safety. Organization.

**Sanitation**

Report of the Secretary of the Committee on Safety and Sanitation (77444 D). 2200 w. A I M E, Bul—March, 1917. Discussion of paper of E. M. Shipp.

Sanitation and Ventilation of Textile Mills (81739 A). W. Fred Dolke, Jr. 3500 w. Sfty Eng—Sept., 1917. Outlines problems to be met and suggests solutions.

Sanitary Standards in Industry (81738 A). J. A. Cousins. 1500 w. Sfty Eng—Sept., 1917. Discussed from the viewpoint of a medical man.

**Shop Fires**

Shop Fire Potection (79251). Paul Hevener. 2500 w. Ry Rev—June 16, 1917. Suggestions of value to those charged with shop administration.

**Sight-Saving**

Sight-Saving in the Industries (76415 A). Gordon L. Berry. Ills. 2500 w. Sfty Eng—Jan., 1917. On a series of panels recently brought out by the National Committee for Prevention of Blindness, their distribution and use, particularly in manufacturing plants.

**Social Work**

Industry's Changing Emphasis (75866). Fred H. Rindge, Jr. 2500 w. Elec Jl—

Jan., 1917. Present social problems in betterment work.

**Steel Works**

Occurence and Mitigation of Injurious Dusts in Steel Works (79332). J. A. Watkins. 14 pp. U S Bur Mines—Tech paper 153. Effects of dusts.

**Typhoid**

L'Impôt De La Typhoide (75577 B). A. Surveyer. 1000 w. Rev Tri Can—Nov., 1916. The toll of typhoid considered in the light of economic value.

**Welfare**

Welfare Work (77202 A). Joseph Caccavajo. Ills. 2500 w. E Cb Phila, Pro—March, 1917. Typical example, showing interest taken by employers.

**Welfare Plan**

The "Welfare Plan" of the Lake Carriers' Association (81881 N). Paul F. Brissenden. 1800 w. U S Dept Labor—Sept., 1917. Explains the plan and the restrictions.

**Welfare Work**

Health the Key to Better Industrial Relations (76853). Allen Sinsheimer. Ills. 3500 w. Auto—Feb. 22, 1917. Welfare methods employed at large works in Akron, Ohio.

Is Welfare Work Good Business? lations (76853). Allen Sinsheimer. Ills. Details of the work in a large factory in England.

Welfare Work in British Munition Factories (78899). 60 pp. U S Dept Labor—No. 222. Reprints of the memoranda of the British health of munition workers committee.

**Workmen's Compensation**

Three Important Problems of Workmen's Compensation (81967 N). Carl Hookstadt. 4500 w. U S Dept Labor—Oct., 1917. Problems include accident prevention, rehabilitation and re-education of injured workers, and free choice in selection of physician.

**Works Dispensary**

Reasonable Equipment of a Works Dispensary (75863). Charles A. Lauffer. Ills. 2500 w. Elec Jl—Jan., 1917. Work of the industrial physician, and equipment of works dispensary.

See also *Re-education*, under EDUCATION.

**Y. M. C. A.**

Y. M. C. A. Workers on 800 Trains to Cantonments (81292). Ills. 2000 w. Ry Age Gaz—Sept. 21, 1917. War work of the Y. M. C. A.

## MISCELLANY

**American Industries**

Preparing American Industries for War (77119 A). Robert-Thurston Kent. 2500 w. Iron Age—March 8, 1917. Serial. 1st part. Problems that must be solved.

How Shall Manufacturers Contribute to American Industrial Progress (75902 A). E. W. Rice, Jr. 1200 w. Gen Elec Rev—Jan., 1917. Necessity of preparing to meet changed industrial conditions.

**Belgian Congo**

The Economic Development of the Belgian Congo (78189 A). M. Horn, with discussion. Map. 14500 w. Roy Soc Arts, Jl—April 6, 1917. Survey and development of natural products.

**British Industry**

The Remobilization of the Industrial Army (74494 A). 2000 w. Engng—Oct. 20, 1916. Editorial on the principle to be adopted in the procedure.

**Canada**

L'Ingénieur Et Le Développement Du Canada (78252 B). A. Surveyor. 10000 w. Rev Tri Can—Feb., 1917. Development of the Dominion by engineers.

**Chemical Imports**

Why Our Chemical Import Statistics Should Be Overhauled (74454 B). Bernhard C. Hesse. 4000 w. Jl Ind & Eng Chem—Nov., 1916. Explanation of reasons why changes are needed.

**Chemical Industry**

Recent Advance in Chemical Industry. (74993N). J. A. Wilkinson. 8500 w. C M M S S A—Sept., 1916. Materials now available for industrial chemical operations, the industries, etc.

The World-Wide Ramifications of the German Chemical Industry (80399 A). 3000 w. Engng—July 20, 1917. Statistics concerning the chemical products.

The Future of Chemical Industry in the United States (81514 A). L. H. Baekeland. Address at National Exposition of Chemical Industries at N. Y. 3500 w. Met & Chem Eng—Oct. 1, 1917. What has been accomplished and the future outlook and needs in the successful prosecution of the war.

**China**

An Engineer's Travels in Western China (75278 A). J. A. T. Robertson. Map & Ills. 9000 w. Min Mag—Nov., 1916. Observations on the mineral districts of Sze-chuan.

**Coal Chart**

A Graphic Chart for the Evaluation of Coal. (75112 B). A. F. Blake. 1500 w.

Jl Ind & Eng Chem—Dec., 1916. Gives chart and explanation of its use.

**Coal Trade**

Economic Aspects of the Coal Trade (74505 A). Langford Ridsdale. 3000 w. Ir & Cl Trds Rev—Oct. 20, 1916. Presidential address before the S. Staffordshire & Warwickshire Inst. of Min. Engrs.

**Competition**

Do Laws Support Competition? (75028). E. B. Fisher. 10500 w. Telephony—Dec. 2, 1916. Competition in telephone business.

**Dyestuffs**

A Census of Artificial Dyestuffs Used in the United States (74460 B). Thomas H. Norton. 10500 w. Jl Ind & Eng Chem —Nov., 1916. Summary of the most important colors imported, prices, cost of packing, freight, insurance, etc.

Position and Promise of British Dyestuff Manufacture (74876). Nature—Nov. 9, 1916. Report of recent progress and difficulties solved.

**East Africa**

L'Afrique Orientale Allemande (74879 B). G. Regelsperger. Ills. 2700 w. La Nat—Oct. 21, 1916. Economic value and future prospects of German East Africa.

**Engineering**

La Ingenieria Y La Guerra (75557 A). S. M. Izaguirre. 11,000 w. Soc Club Ing Rv—Nov., 1916. History of development of engineering in war.

Public Engineering and Human Progress (76735 A). Morris Llewellyn Cooke, with discussion. 21 pp. Cleve Eng Soc, Jl—Jan., 1917. Critical discussion of the general attitude of engineers toward public service. Objections and prejudices to be overcome.

The Engineering Outlook (76919). 4000 w. Times Eng Supp—Jan. 26, 1917. Capital, employment, foreign competition, etc., in the future.

The New Factories (76918). 5000 w. Times Eng Supp—Jan. 26, 1917. How the new British factories may be utilized after the war. Views of leading manufacturers.

**Engineering Society**

The Engineering Society—Its Past, Present, and Future Activities (74615 B). Ernest McCullough, with discussion. 11 pp. West Soc Engrs, Jl—Oct., 1916. Suggested activities.

**Engineers**

The Engineer in Canada (75016). Sir Wilfrid Laurier. 1800 w. Can Engr—Nov. 30, 1916. Speech before Can. Soc. of Civil Engrs.

Chinese Engineers for British Firms (75898 A). Middleton Smith. 2000 w. Engr—Dec. 22, 1916. Conditions and prospects in China. Government service.

The Duty of the Engineer to His Client and Himself (75989 A). Stewart A. Jellett. 6000 w. E Cb Phila—Jan., 1917. Their relationship discussed in detail.

The Gap Between Commercial Men and Engineers (76039 B). Charles W. Mears. 1800 w. S A E, Bul—Dec., 1916. Differences and reasons for them.

**Engineers' Association**

The American Association of Engineers (82061 A). 7 pp. Engrs Cb Balt—Sept., 1917. Its aims, policies, and methods.

**Explosions**

Initiation of Explosions (77204 A). Walter Arthur. 4500 w. E Cb Phila, Pro—March, 1917. Difficulties encountered and overcome.

**Experts**

Handling Iron and Steel Export Shipments (74625 A). F. A. Kelly. 1500 w. Iron Age—Nov. 16, 1916. How problems of war time have been met.

**French Industries**

Moyen De Développer En France L'Industrie Chimique (74902 B). G. Urbain. 2700 w. Gen Civ—Nov. 4, 1916. Suggestions for better development of French chemical industries.

**Gary, Elbert H.**

Iron and Steel Institute Honors Judge Gary (74332 A). 3500 w. Iron Age—Nov. 2, 1916. Address of President Elbert H. Gary on impressions from a recent trip to the Orient.

**Germany**

The German Textile Machinery Industry (76385 A). 1800 w. Engng—Jan. 12, 1917. Editorial review of this industry.

**Imperial Industries**

Imperial Industries After the War (77155 A). Octavius C. Beale, with discussion. 9500 w. Roy Soc Arts, Jl—Feb. 16, 1917. Urges preference for the allied countries in trade to help them in recovery and restoration.

**Industrial Engineering**

Industrial Engineering: Present Position and Post-War Outlook (75885 A). F. W. Lanchester. Abstract of presidential address to the Joun. Assn. of Engrs. 3500 w. Elec'n—Dec. 22, 1916. Problems affecting capital and labor after the war.

**Japan**

Engineering Experiences in Japan (77793). George A. Reichard. Ills. 1500 w. Natl Engr—April, 1917. Installation work under difficulties. Obstacles to be overcome.

**Kansas**

Industrial Development in Kansas (80699 N). P. F. Walker. 20 pp. Univ

Kansas—1917. Discussion of localities and industries, development, etc.

**Latin America**

Latin America, Its Economic and Engineering Possibilities (75271 A). John Barrett. 6500 w. E Cb Phila—Dec., 1916. Significance of Pan-American development.

**Lord Kelvin**

Some Aspects of Lord Kelvin's Life and Work (74992 A). Alexander Russell. 4500 w. Elec'n—Nov. 17, 1916. Abstract of eighth Kelvin lecture.

**Machine Tools**

The Future of the Machine Tool Business in Russia (81491 A). A. M. Peskine. 2500 w. Machy—Oct., 1917. Conditions to be met after the war.

**Maxim, Sir Hiram S.**

The Late Sir Hiram Stevens Maxim (75399 A). Photo. 2200 w. Engng—Dec. 1, 1916. Biographical sketch of a noted inventor.

**Meteorology**

The Weather Business (79077 A). George S. Bliss. Ills. 3500 w. E Cb Phila, Pro—June, 1917. Activities of the weather bureau.

**National Defense**

Railways as a Part of a System of National Defense (74647 A). W. L. Park, with discussion. 15 pp. West Ry Cb, Pro—Sept. 18, 1916. Service that would be required in event of war, requirements, special equipment, etc.

**Nitrate Industry**

Conditions Affecting the Establishment of the Nitrate Industry in the United States (74453 B). Lawrence Addicks. 1500 w. Jl Ind & Eng Chem—Nov., 1916. Factors causing confusion as to the relative merits of available processes.

**Pacific Industries**

Commerce and Industries of the Pacific (76727 A). W. D. Dodson. 3000 w. Ore Soc Engrs—Jan., 1917. The importance of the industrial development of Pacific seaports to handle the increasing Oriental trade.

**Portugal**

Le Portugal Economique (78276 B). A. Pawlowski. Ills. 3600 w. La Nat—Mar. 24, 1917. Natural resources, industries, commerce, etc. Possible developments.

**Preparedness**

Preparedness: The American Way (74875). 1800 w. Nature—Nov. 2, 1916. Review of the movement in the U. S.

**Public Service**

The Engineer and Public Service (76025 B). Clarence T. Johnston, with discussion. 10,500 w. West Soc Engrs, Jl—Nov., 1916. Their responsibility, and duty.

**Royal Engineers**

The Work of the Royal Engineers in the Field (76290 C). C. G. Martin. 10 pp. Prof Mem—Jan.-Feb., 1917. Some of the work of general interest.

**Russia**

The Economic Development of Russia and Britain's Interest Therein (75216 A). Leslie Urquhart, with discussion. 11,000 w. Roy Soc Arts, Jl—Nov. 24, 1916. Russia's internal and external financial position, and the future outlook; industrial resources and their development during and after the war.

Russia the Most Promising After-the-War Market for American Products (75721 D). C. Fraboni. 6000 w. Iron Age—Jan. 4, 1917. Special No. Lines of procedure in building up trade.

L-Avenir Économique De La Russie Boréale (76946 B). C. Rabot. Ills. 1500 w. La Nat—Jan. 27, 1917. Economic development, commerce, etc., of northern Russia.

The Way to Win Trade in Russia (76720 A). D. L. Hough. 4000 w. Iron Age—Feb. 15, 1917. Present conditions and the outlook for American products after the war.

The Russian Village and the War (79328 A). Robert E. Blake. 1800 w. Sci M—June, 1917. Conditions before and since the war.

Russia in War Time (82108). Horace V. Winchell. Ills. 6000 w. Min & Sci Pr—Oct. 27, 1917. Information on Russian conditions.

The Russian Market, Its Possibilities and Problems (81518 A). A. J. Sack. 2000 w. Met & Chem Eng—Oct. 1, 1917. Goods needed in U. S. imported from Russia, and vice versa.

**South America**

West Coast Travel Observations (75443). A. P. Rogers. 4000 w. Eng & Min Jl—Dec. 23, 1916. Conditions that must be met by American engineers.

**Sugar Cane**

The Extraction of Sugar-Cane Mills (77172 A). P. H. Parr. 1500 w. Engr—Feb. 16, 1917. Explains simple and compound imbibition.

**Sweden**

L'Influence De La Guerre sur la vie économique de la Suède (76939 B). 1600 w. Gen Civ—Jan. 20, 1917. War's effect on the imports of food and exports of iron ore, etc., upon Sweden.

**Trade**

Electrical Trade in India After the War (74465 A). G. R. Drummond. 2000 w. Elec Rev—Oct. 20, 1916. Outlook and suggestions.

Foreign Markets for Electrical Goods (74400). R. A. Lundquist. 2000 w. Elec Wld—Nov. 4, 1916. Export trade at present mainly with Canada, South America and Japan.

Latin American Engineering Opportunities (74778 A). Percy F. Martin. 2000 w. Cas Eng Mthly—Nov., 1916. Openings for British manufacturers.

Notes on the Machinery Industry in Europe (74283 A). Alexander Luchars. 2000 w. Machy—Nov., 1916. Probable conditions after the war.

What the Development of Foreign Trade Means to the Engineer (74833). F. Lavis. 2500 w. Eng Rec—Nov. 25, 1916. Expansion depends on foreign investment.

World Trade Readjustments After the War (74621 A). Sterling H. Bunnell. 1800 w. Iron Age—Nov. 16, 1916. Effect of the war and the outlook at its close.

British Overseas Trade After the War (75872 A). 1200 w. Eng Rv—Dec., 1916. Present position and future development.

Cooperation in Export Trade (75843 A). Extract from report of the Federal Trade Commission. 2500 w. Machy—Jan., 1917. Methods employed by various countries for control of trade.

Latin American Engineering Opportunities (76178 A). Percy F. Martin. 3000 w. Cas Eng Mthly—Jan., 1917. Fields of enterprise are considered.

Co-operation in Trade After the War (76440 A). James A. Farrell. 1800 w. Iron Age—Feb. 1, 1917. Views on European reconstruction, American export trade, etc.

The Foreign Trade Aspect of the Tariff (76439 A). Willard Straight. Address before Nat. Foreign Trade Con. 2500 w. Iron Age—Feb. 1, 1917. Features of importance in view of new European alignments.

**U. S. Resources**

War Stimulates Use of Neglected Resources (79768). William C. Redfield. 5000 w. Auto—July 5, 1917. Shows how experimental study has overcome shortage of many commodities previously secured from abroad.

**War Problems**

Our Part in the War (79168). 4500 w. Cl Age—June 9, 1917. Serial, 1st part. Information from addresses at a conference in Washington, May 25, aiming to promote more effective use of business energies.

# MARINE AND NAVAL ENGINEERING

**Address**

Address by President-Elect E. W. Rice, Jr. (80493 D). 2500 w. A I E E, Pro—Aug., 1917. The war, and the work it demands.

**American Crews**

Manning of Our Future Merchant Fleets (81561 A). 1500 w. Int Mar Eng —Oct., 1917. Urges the training of American boys for the sea.

**American Shipping**

American Shipping and Shipbuilding (80572 A). 2000 w. Engng—Aug. 3, 1917. Editorial on the recent revival of those industries.

Shipping to Latin America (77821 A). A. Eugene Bolles. 2000 w. Int Mar Eng —April, 1917. Remarkable increase in American ships.

**Auxiliaries**

Changes and Advances in Marine Auxiliaries (77825 A). W. D. Forbes. 1200 w. Int Mar Eng—April, 1917. Distinctive features.

Improvements in Marine Engine Room and Fire Room Auxiliary Machinery (77825 A). Ills. 1500 w. Int Mar Eng —April, 1917. Changes in pumping machinery.

Electric Ship Auxiliaries (78457 A). H. A. Hornor. 2500 w. Am Soc Mar Dftn, Jl—April, 1917. Motors employed, voltage and control, advantages and disadvantages.

Electrification of Auxiliaries in the Merchant Marine (81049 A). C. G. Schafer. 1500 w. Am Soc Mar Dftn, Jl —July, 1917. Serial, 1st part.

**Battleships**

The Naval War and the Size of Battleships (75653 A). William Hovgaard. 2500 w. Engng—Dec. 15, 1916. Serial, 1st part. Conditions that must be considered in determining size, showing that battleships and battle-cruisers are still indispensable.

The Revival of the Monitor (80979 A). 3500 w. Engr—Aug. 17, 1917. Details of the first "Monitor" and its armament and later vessels of similar type.

**Bearings**

The Michell Bearing (78869). 1000 w. Times Eng Supp—Apr. 27, 1917. Advantage of this for turbine shafts, as compared with thrust bearing, and maintenance of the oil film.

**Bibliography**

Bibliography of the Literature of Submarines, Mines and Torpedoes (80238 A). David B. Rushmore, assisted by William H. Lanman and Eric A. Lof. 19 pp. Gen Elec Rev—Aug., 1917.

**Boilers**

Boiler Gaskets and Packings for the Navy (81153 F). H. T. Winston. 28 pp. Am Soc Nav Engrs, Jl—Aug., 1917. Types, investigations, tests, and conclusions.

**British Navy**

The Navy and the War (76387 A). John R. Jellicoe. 2500 w. Engng—Jan. 12, 1917. Address reviewing the work of the Navy during the war.

**Bulkheads**

On a Method of Obtaining for Ship Design the Spacing of Bulkheads According to the Rules of the International Convention (78380 N). W. J. Lovett. Plates. 8 pp. Instn Nav Archts—March 28, 1917. Details of method in use since 1915.

The Closing of Side Apertures in Ships from the Bridge (78378 N). E. Benvenuti. Ills. 12 pp. Instn Nav Archts—March 28, 1917. Describes recent arrangements for the simultaneous closing from the bridge of all sidelights and apertures.

Data for Bulkhead Construction (79699 A). F. K. Ruprecht. 700 w. Int Mar Eng—July, 1917. Curves giving section modulus of bulkhead stiffeners required by Lloyd's rules from length of stiffener.

**Cargo Carriers**

Wooden Cargo Carriers for U. S. A. (78936 A). Ills. 4000 w. Mar Rev—June, 1917. Proposed standard wooden vessels to be built for the government.

**Cargo Ships**

Building Cargo Ships (80736). 1000 w. Times Eng Supp—July 27, 1917. British plan for standard ships. What has been accomplished.

Composite Cargo Steamer of 5,500 Tons for U. S. Shipping Board's Emergency Fleet (80366 A). Ills. 2500 w. Int Mar Eng—Aug., 1917. Designed by William B. Ferguson.

Problem of the Wooden Cargo Ship (78484 A). William T. Donnelly. Ills. & 2 Plates. 2500 w. Int Mar Eng—May, 1917. Calculations relative to construction.

**Cavitation**

On Cavitation: A Study of the Screw-Propeller (77913 A). C. H. Holst. 3000 w. Engng—March 16, 1917. A study of the action of ships' screws.

**Classification**

Ship Classification and Registry (77829 A). Stevenson Taylor. 1800 w. Int Mar Eng—April, 1917. Origin of classification societies. Their functions and influence on shipbuilding.

**Coal Loading**

Belt Conveyor Coal Loading Plant in N. S. W. (76144 A). Ills. 3500 w. Engr—Jan. 5, 1917. Important plant at Port Kembla. Particulars from a paper by E. M. de Burgh.

**Collier**

Le "Milazzo," Navire Charbonnier Et Petrolier (80020 B). Ills. 2000 w. Gen Civ—June 23, 1917. An Italian vessel of 11,400 gross tons for carrying either coal or oil for naval supply.

**Concrete**

Concrete for Ships (79436). 2300 w. Times Eng Supp—May 25, 1917. Application of concrete to marine construction based on experiments of various kinds. Former attempts.

**Concrete Ships**

Reinforced Concrete Ships (80173). J. L. Weller. Ills. 1200 w. Can Engr—July 26, 1917. Claims the suitability of this material for vessels.

Reinforced Concrete For Shipbuilding (79698 A). Allen Hoar. Ills. 2500 w. Int Mar Eng—July, 1917. Its application to ship construction; design for barge and freight steamer.

**Coöperation**

Co-operative Management (81560 A). Arthur F. Johnson. 2200 w. Int Mar Eng—Oct., 1917. Shipyard strikes; cause of labor trouble.

**Cranes**

The "German Way" of Loading and Discharging Cargo (75223 A). H. H. Broughton. Ills. 800 w. Elec'n—Nov. 24, 1916. Modern crane installation at Hamburg.

Trasbordatori Per Navi (78262 C). W. Leonesi. Ills. 4800 w. Ingeg Ferro—Feb. 28, 1917. Various types of wharf cranes for loading and unloading vessels.

**Cruisers**

Les Croiseurs Légers (75567 B). Ills. 5600 w. Gen Civ—Nov. 25, 1916. Light cruisers in the world's navies, particularly of England and Germany. Designs compared.

The Losses of German Light Cruisers (75138 A). Ills. 1300 w. Engr—Nov. 17, 1916. Information concerning the present supply and the destruction of scouting cruisers.

**Derrick Booms**

Strength of Derrick Booms (78458 A). Peter Doig. 500 w. Am Soc Mar Dftn, Jl —April, 1917. Diagrams and their application.

**Design**

Mast, Boom and Rigging Design (77121 A). F. K. Ruprecht. 2500 w. Int Mar Eng—March, 1917. Analytical and graphical methods of obtaining stresses in rigging.

Ship Design (78282). 1300 w. Times Eng Supp—March 30, 1917. Rules of British Corporation for Survey and Registry of Shipping.

**Destroyers**

I Cacciatorpediniere Germanici (77567 C+D). A. Barpi. Ills. 3400 w. Riv Marit—Dec., 1916. Growth and estimated strength of Germany's torpedo boat destroyer fleet. Possibilities in the Great war. Comment.

**Diesel Engines**

The Diesel Engine (74429 A). Hubert C. Verhey. Ills. 4000 w. Am Soc Mar Dn—Oct., 1916. Its merits.

**Docks**

The Remodelling of an Old Graving Dock at Southampton (77655 A). R. N. Sinclair. Abstract of paper read before the Concrete Institute. Ills. 2000 w. Engng—March 9, 1917. Changes to accommodate modern ships of large tonnage.

Equipment of King George Dock, Hull (78192 A). Ills. Read before joint meeting of Liverpool, Eng., Soc. of Manchester Sec. of I. E. E. 1800 w. Elec Rev—March 30, 1917. Serial, 1st part. Dock opened June, 1914. Electric power used to the fullest extent.

Kingston Dock, Glasgow; Improvement and Reconstruction (77915 A). P. D. Donald. Plates. 7500 w. Engng—March 16, 1917. Detailed description.

See same heading under CIVIL ENGINEERING, *Waterways and Harbors*.

**Dry Docks**

Estudis Critico Del Nuevo Dique De Carena (74881 D). B. Benigni. Ills. 64 pp. Univ Nac Plata—Aug., 1916. Design of dry dock to be built at Bahia Blanca.

Temporary Dry Dock Made with Sheet Piling (76555 A). Ills. 500 w. Engr—Jan. 19, 1917. At Valparaiso.

Dry Dock Development in Twenty Years 77830 A). Ills. 900 w. Int Mar Eng—April, 1917. Features developed in basin or gravity docks, floating dry docks and marine railways.

The Sidehaul Railway Dry Dock at West Memphis, Arkansas. (80142 B). Clarke S. Smith. Ills. 1200 w. Prof Mem—July-Aug., 1917. Details of a dock of the side-haul railway type.

**Drinking Water**

Purifying Drinking Water on Ships (77729 A). J. Forbes. 1500 w. Mar Rev —April, 1917. Methods of safeguarding the water used for drinking and cooking.

**Dynamics**

The Equivalent Mass in Rigid Dynamics, with Applications to Gyroscopes and Screw Propellers (76631 B). A. F. Zahn. 900 w. Fkn Inst, Jl—Feb., 1917. Theory and application.

**Electric Drive**

Electric Drive for Battleship Tennessee (80359). Ills. 1200 w. Power—Aug. 7, 1917. Will be driven by 4 a. c. motors, one to each propeller shaft. Description of power plant.

**Engines**

Engines for New Vessels (78872). 1200 w. Times Eng Supp—Apr. 27, 1917. Efforts of the British Shipping Controller to obtain standard designs for marine engines.

High-Speed Engines Gain For Marine Work (79619). J. Edward Schipper. Ills. 3500 w. Auto—June 28, 1917. War requirements increase demand for fast power craft.

Motor or Steam Engine (82023). J. C. Shaw. 1100 w. Naut Gaz—Oct. 4, 1917. Advantages and economies of motor ships.

Marine Engine Construction (81494 A). N. I. Mosher. Ills. 2000 w. Machy —Oct., 1917. Methods used in Boston navy yard.

Standardization of Marine Engines for Cargo Steamers (81846 A). W. V. Lang. 2000 w. Mech Wld—Oct. 5, 1917. Read before Inst. of Marine Engrs.

**Evaporators**

Operation of Marine Evaporators (80618). Charles H. Bromley. Ills. 2500 w. Power—Aug. 21, 1917. Description of the Reilly evaporator. Directions applying to all evaporators.

**Ferro-Concrete**

Ferro-Concrete Vessels (80978 A). Ills. 1500 w. Engng—Aug. 17, 1917. Examples of ferro-concrete vessels built within the last five or six years.

**Fire Control**

The Value of Voice Pipes For Fire Control Communication (80106 A). Elliot Snow. Ills. 26 pp. U S Nav Inst, Pro —July, 1917. Reviews the present knowledge concerning their use.

**Flat Plates**

Stress Determination in a Flat Plate (78379 N). J. Montgomerie. Ills. & Curves. 10 pp. Instn Nav Archts—March 28, 1917. Results of tests.

**Fog Signals**

On the Acoustic Efficiency of Fog Signal Machinery (77466 B). Louis Vessot King. Ills. 27 pp. Bkn Inst, Jl—March, 1917. Experiments of other investigators and author's tests.

Acoustic Efficiency of Fog-Signal Machinery (80402 A). 2000 w. Engng—July 20, 1917. Remarks on past and recent investigations.

**Forced Draft**

Forced Draft for Marine Boilers (80802). Charles H. Bromley. Ills. 800 w. Power—Aug. 28, 1917. Details of the two most widely used systems of forced and induced draft.

**France**

Notre Marine Marchande (78303 B). E. Coustet. Ills. 2800 w. La Nat—April 14, 1917. French merchant marine.

**Freight Steamer**

Freight Steamer Edward Luckenbach (76517 A). Ills. 1800 w. Int Mar Eng —Jan., 1917. First of five sister ships building at Fore River shipyard. Propulsion by geared turbines.

**French Shipping**

The Early History of the French Atlantic Services (77171 A). E. Evers and A. Mallet. Ills. 3000 w. Engr—Feb. 16, 1917. Abstract translation from Bul. of *Soc. des Ings Civ de France.*

**Gas Analysis**

Directions for Using the Gas Analysis Apparatus (77304 F). W. T. Conn, Jr., Ills. 3300 w. Am Soc Nav Engrs, Jl—Feb., 1917. The Orsat-Muencke apparatus and its use on board ships.

**Geared Turbines**

De Turbines Met Tantrad-Overbrenging Van Het S.S. "Sitoebondo" (80015 B). R. C. Weidenaar. Ills. 1300 w. Ingr—June 9, 1917. Geared turbine recently installed in Dutch ship.

**German Fleet**

The German High Sea Fleet and Its Bases (79735 A). Ills. 3000 w. Engr—June 15, 1917. Serial, 1st part. The present article discusses the strength of the fleet.

**German Yards**

Les Chantiers Maritimes Allemands (74918 B). V. Cambon. Ills. 2800 w. La Nat—Nov. 4, 1916. Description of important shipbuilding plants.

**Great Britain**

New British Tonnage (77579). 1300 w. Times Eng Supp—Feb. 23, 1917. Consideration of labor's attitude and the State plans for more active shipbuilding work.

**Gyroscope**

Les Applications Du Gyroscope Dans La Marine (78881 B). F. Marguet. Ills. 9000 w. Rev Gen Sci—Apr. 30, 1917. Applications of the gyroscopic principle in compasses, stabilizers, etc.

Le Gyroscope Et Ses Applications (82030 B). H. Volta. Ills. 3500 w. La Nat—Sept. 29, 1917. Theory of simple gyroscope and its development into the gyroscopic compass and the stabilizer.

**Hydroplane**

A Hydro-Vane Boat (78455 A). N. A. White. Ills. 4000 w. Am Soc Mar Dftn, Jl—April, 1917. Towing experiments, with proposed type for a large hydrovane boat.

**Indicated H. P.**

A Method of Finding the I. H. P. for Steamships (79336 N). E. W. De Rusett. 700 w. N E C Instn—June, 1917. Means of estimating the power required for the propulsion of steamers.

**Industry**

See same heading under MECHANICAL ENGINEERING, *Machine Works and Foundries.*

**Ironclad**

The Pioneer Ironclad (81941 A). James Morris Morgan. Ills. 3500 w. U S Nav Inst, Pro—Oct., 1917. Information concerning early ironclads, particularly the *Manassas.*

**Japan**

L'Industrie Japonaise Et Les Alliés (78304 B). V. Forbin. Ills. 2600 w. La Nat—April 14, 1917. Japanese shipyards, gun shops, equipment, etc. Work done for the Allies.

**Launching**

On Launching (78375 N). Percy A. Hillhouse, and William H. Riddlesworth. Diagrams. 23 pp. Instn Nav Archts—March 29, 1917. Method of calculating launching pressures and moments.

The Launching of the U. S. S. Monongahela (79355 A). David A. Hall. Ills. 12 pp. U S Nav Inst, Pro—June, 1917. This vessel was thrown on shore in Danish West Indies, Nov. 18, 1867.

Launching Way-End Pressures (76120 A). Peter Doig. 800 w. Am Soc Mar Dftn, Jl—Jan., 1917. How to make their calculation easy.

**Lighthouses**

Note Sull' Illuminazione (74873 C+D). G. Chierchia. 12,000 w. Riv Marit—Sept., 1916. Comprehensive review of the cost of maintaining lighthouse service.

De vernieling van den Oostelijken Lichttoren op Noord-Schouwen (76222 B). H. S. DeRoode. Ills. 1500 w. Ingr—Dec. 9, 1916. Methods used in destroying a lighthouse of obsolete type.

Een en ander omtrent de Nederlandsche Kustverlichting (76223 B). P. Van B. Van Vloten. Ills. 4600 w. Ingr—Dec. 16, 1916. Location, intensity and other details of lights along Dutch coast of the North Sea.

**Lost Tonnage**

The Shipbuilders' Task (81420). 1500 w. Times Eng Supp—Aug. 31, 1917. Replacing the lost tonnage of Great Britain. Statistics of destruction in the war.

**Lubricants**

Straight Mineral Oil Versus Compounded Oil for the Bearings of Marine Engines Not Having Forced Lubrication (77305 F). J. L. Kauffman. Curves. 2800 w. Am Soc Nav Engrs, Jl—Feb., 1917. Compares relative advantages and disadvantages under great variety of conditions.

**Lubrication**

Forced Lubrication for Marine Turbines (77827 A). 1500 w. Int Mar Eng—April, 1917. Combined gravity and forced system.

Navy Lubricants and Lubrication (79187 F). H. T. Winston. 22 pp. Am Soc Nav Engrs, Jl—May, 1917. Kinds of oils used; how they are selected, tested, and purchased.

Forced Lubrication (81152 F). A. T. Church. Plates. 2500 w. Am Soc Nav Engrs, Jl—Aug., 1917. Data from reports of officers in the Fleet.

**Machinery**

The Development of Machinery in the U. S. Navy During the Past Ten Years (79186 F). C. W. Dyson. 43 pp. Am Soc Nav Engrs, Jl—May, 1917. Reviews history of development during the past ten years.

**Marine Boilers**

Draught and Temperature Regulator for Marine Boilers (74773 A). John Ingham. Ills. 2000 w. Cas Eng Mthly—Nov., 1916. Results of tests.

Care of Marine Boilers (76520 A). Edward B. Fraser. (Letter.) 3000 w. Int Mar Eng—Jan., 1917. Causes of corrosion, leaking, overheating, etc., and the prevention.

**Marine Engines**

Guidance Specifications for Reciprocating Triple Expansion Marine Engines for Cargo Boats (76814 N). 1500 w. N E C Instn—Feb., 1917. Draft of proposed specification aiming at standardization of parts.

Guidance Specification for Reciprocating Triple Expansion Marine Engines for Cargo Vessels (79349 N). 9 pp. N E C Instn, Trans—May, 1917. Compiled by the council and members.

Marine Engine Chart (79062 A). T. Addison. 1000 w. Int Mar Eng—June, 1917. Graphical determination of dimensions of triple-expansion marine engines.

The Main Engines of the U. S. S. Cuyama (79191 F). F. J. Cleary. Ills. 1500 w. Am Soc Nav Engrs, Jl—May, 1917. Details of method of handling as an assembled unit.

**Maritime Commerce**

Les Ports Français Et La Guerre (79427 B). A. Dumas. 3800 w. Gen Civ—May 26, 1917. Summary of commerce at principal French ports 1913-1916 inclusive.

**Merchant Marine**

Regulation of a Government Fostered Merchant Marine by the Automatic Tempering of Its Securities (75336 F). Frederick Kellogg Blue. 14 pp. Am Ec Rv —Dec., 1916. Methods of subsidizing and their control.

**Model Experiments**

Further Experiments Upon Wake and Thrust Deduction (78212 A). W. J. Luke. Read before Instn. Nav. Archts. 2200 w. Engng—April 6, 1917. Notes on results of model experiments, complementary to two earlier papers.

Straight-Lined Ship Model Experiments (80367 A). Albert Ed. Saunders. Ills. 700 w. Int Mar Eng—Aug., 1917. Investigation of form of sea-going vessel best suited for emergency construction.

**Motor Ships**

The Motor Tank Ship Hamlet (74503 A). Ills. 1200 w. Engr—Oct. 20, 1916. Maiden voyage of oil tank ship equipped with Diesel engines. Descriptive.

The Twin-Screw Motor-Ship "Abelia" (74493 A). Ills. & Plate. 1800 w. Engng—Oct. 20, 1916. Serial, 1st part. The special feature is the application of the Diesel engine for propulsion.

De scheeps-zuiggasmotorinstallatie van het motorschip "Wilhelmina" (77572 B). G. Beerenborg. Ills. 2400 w. Ingr—Feb. 24, 1917. Dutch motor ship with 350 h.p., 6 cylinder engine running on producer gas.

Four-year Test of Motor Ship Fleet (77728 A). 2200 w. Mar Rev—April, 1917. Results measured by big Danish shipping and trading company.

Motor Ship Development During the War (77824 A). J. Rendall Wilson. Ills. 1700 w. Int Mar Eng—April, 1917. Risk of destruction by submarines greatly reduced on motor ships, as they show no smoke.

**Naval Architects**

The Japanese Society of Naval Architects (79728 A). Ills. 1800 w. Engng—June 15, 1917. Reviews papers presented at the 20th annual meeting of this society.

**Naval Architecture**

The Science of Naval Architecture (79859 B). David Watson Taylor. 12 pp. Fkn Inst, Jl—July, 1917. Sciences involved in building a vessel; branches of naval architecture, progress, problems.

The Science of Naval Architecture (80209 A). David Watson Taylor. 4500 w. Mar Rev—Aug., 1917. Problems in ship design.

**Naval Construction**

The San Marcos Experiments (78671 A). Ills. 4000 w. Engr—April 27, 1917. Account of tests made to determine the best protection of battleships.

**Naval Service**

Naval Service for Mechanical Engineers (77302 A). Frederic G. Coburn. 2200 w. Iron Age—March 15, 1917. What need there is in navy yards in time of war and how applicants may register.

**Navies**

The Austro-Hungarian Navy (75401 A). 3000 w. Engr—Dec. 1, 1916. Survey of its resources, and its activities in the war.

**Navigation**

Some Practical Hints in Navigaton (78113 A). F. L. Oliver. 3000 w. U S Nav Inst, Pro—April, 1917. Navigational ideas.

**Navy Yards**

Modern Management Applied to Navy Yards (78775 A). F. G. Coburn. Ills. 18 pp. U S Nav Inst, Pro—May, 1917. Application at the Philadelphia navy yard and the results.

Mare Island Navy Yard (81688). Ills. 900 w. Am Machy—Oct. 11, 1917. Details of work at the Government yard.

New Shipyards (81424). 1100 w. Times Eng Supp—Aug. 31, 1917. New yards recently beginning work in England and Scotland.

**Oil Coolers**

The Performance of Lubricating Oil Coolers (79190 F). M. C. Stuart. 18 pp. Am Soc Nav Engrs, Jl—May, 1917. Certain features of their performance, indicating the relation between performance and the weight, volume, and amount of cooling surface.

**Oil Engines**

The "Beardmore" Marine Oil Engine (81068 A). Plate. 2500 w. Engng—Aug. 24, 1917. Designed to meet the requirements of marine propulsion.

**Oil Fuel**

Advantages of Oil Fuel (81389). Ray Vance. 1800 w. Naut Gaz—Sept. 6, 1917. Comparison of bunker capacity for coal and oil fuel ships. Future development seems to rest upon transportation facilities.

**Oils**

Examination of Oils from the Atlantic Fleet, Before and After Use (79192 F). J. G. O'Neill. 14 pp. Am Soc Nav Engrs, Jl—May, 1917. Chemical examination to determine changes in service.

**Oil Tankers**

Development of American Oil Tankers (77123 A). J. H. Morrison. 3000 w. Int Mar Eng—March, 1917. Serial, 1st part. Review of early and recent oil carriers. Increase in capacity.

**Piers**

New Baltimore and Ohio Coaling Pier (78487 A). Ills. 1500 w. Int Mar Eng—May, 1917. Type, details of the scheme, pier capacity, etc.

**Pin Joints**

The Design of Pin Joints Based on Ultimate Strength (78377 N). Walter A. Scoble. Ills. 11 pp. Instn Nav Archts—March 28, 1917. Tests and results.

**Power Boats**

Naval Power-Boat Construction in America (80981 A). Ills. 2500 w. Engr—Aug. 17, 1917. An account of methods of rapid construction adopted and the results.

**Progress**

Review of the Progress of Marine Engineering During the Last Twenty-year Period (77822 A). William T. Donnelly. 2000 w. Int Mar Eng—April, 1917. Conditions 20 years ago contrasted with today.

**Propellers**

Tables and Curves for Solution of Propeller Problems by the Dyson Method, and a New Method of Estimating Revolutions (75294 F). S. M. Robinson. 22 pp. Am Soc Engrs, Jl—Nov., 1916.

The Running Balance of Propellers and The Vibration of Ships (78207 A). J. J. King-Salter. Read before Inst. of Nav. Archts. Plate. 4500 w. Engng—March 30, 1917. Experimental investigations and results.

Two Papers Dealing With Some Tests on Model Propellers (77952 N). J. Lawrence Hodgson. Ills. 24 pp. Inst Aut Engrs—March, 1917. I. The "Characteristic Curves" of a Propeller. II. "An experimental investigation as to the relation between the 'Thrust Ratio' of Lifting Propellers and the number, arrangement, shape, section and pitch of their blades."

The Development of Screw Propulsion During the Past Twenty Years (77823 A). C. W. Dyson. 1000 w. Int Mar Eng—April, 1917. Scientific investigation brings efficient production of high speeds.

The Power Required to Drive a Partially Immersed Screw Propeller (78050 A). C. H. Holst. 500 w. Engng—March 23, 1917. Data obtained from the official log-book of a Netherlands steamer.

An Analysis of Model Screw Propeller Experiments (79587 A). S Motora. Charts. 1800 w. Engng—June 8, 1917.

Theory of Air and Water Screws (79618). J. Edward Schipper. 2000 w. Auto—June 28, 1917. Notes on the theory of propellers.

**Propulsion**

Advantages and Future of Electric Ship Propulsion (75747). W. L. R. Emmet. Ills. 2500 w. Elec Wld—Jan. 6, 1917. Opinions on the advantages, proposed apparatus, development and expediency.

Geared Turbine Installation for the S. S. "City of Canton" (75652 A). Ills. & Plate. 1000 w. Engng—Dec. 15, 1916. Serial, 1st part. Drawings and details for a single-screw installation.

Operation of Curtis Steam Turbines and Alquist Reduction Gears in the Propulsion of Cargo Ships (75907 A). W. J. Davis, Jr. Ills. 2500 w. Gen Elec Rev—Jan., 1917. Merits explained.

Rival Systems of Ship Propulsion (76923). 2000 w. Times Eng Supp—Jan. 26, 1917. Review of geared steam turbines, standard reciprocating engines, Diesel and other combustion engines and the electric drive.

Alquist Gearing for Ship Propulsion (77142 A). W. L. R. Emmet. Ills. 2000 w. Gen Elec Rev—March, 1917. Description and results secured.

Geared Turbine Propelling Machinery for the S. S. Maui (77129). W. W. Smith. Ills. 2000 w. Elec Jl—March, 1917. Large passenger vessel for service between San Francisco and Hawaiian Islands. Details of machinery.

Machinery for Capital Vessels (77307 F). H. C. Dinger. 4000 w. Am Soc Nav Engrs, Jl—Feb., 1917. Under water protection and machinery layout to secure economy and compactness.

A Method of Finding the I. H. P. for Steamships (80445 N). E. W. de Russett, with discussion. 23 pp. N E C Instn, Trans—July, 1917. Suggests a means of estimating the power required for the propulsion of steamers.

Ship Handling with Electric Propulsion (80631 A). C. S. Kempff. 3000 w.

U S Nav Inst, Pro—Aug., 1917. General description of "Jupiter" machinery and regulation of ship speed and control.

On the Effect of Wake-Stream in the Case of Single-Screw Steamers (80974 A). C. H. Holst. Ills. 3000 w. Engng —Aug. 17, 1917. Indicates a method of using this factor in calculations of propeller efficiency.

Westinghouse Geared Turbine Propeling Machinery for Swedish Battleships Gustaf V and Drottning Victoria (81150 F). William W. Smith. Ills. 17 pp. Am Soc Nav Engrs, Jl—Aug., 1917. Detailed description of turbines, etc.

**Reduction Gears**

Marine Applications of Reduction Gears of Floating Frame Type (78210 A). John H. Macalpine. Read before Instn of Nav Archts. Ills & Plate. 2500 w. Engng—April 6, 1917. Two applications are described.

**River Navigation**

River Steamboating (76521 A). 2500 w. Int Mar Eng—Feb., 1917. Observations on western river navigation in the United States.

**Rolling**

Rolling of Ships and Methods of Damping It (76516 A). Arthur R. Liddell. 2500 w. Int Mar Eng—Jan., 1917. Ships' rolling period, and some damping devices that have been tried.

**Rolling Tanks**

De tanks van Frahm om het slingeren van zeeschepen te verminderen (80714 B). J. C. A. Schokker. Ills. 3900 w. Ingr—July 14, 1917. Rolling tanks of the Frahm and their effect on ships in heavy seas.

**Rudders**

Notes on Rudders (81594 A). Carl E. Petersen. Ills. 1500 w. Int Mar Eng—Oct., 1917. Stresses in rudder stock; formulæ used.

**Safety Appliances**

Closing of Side Apertures From the Bridge (81564 A). Ing. E. Benvenute. Ills. 4500 w. Int Mar Eng—Oct., 1917. Device for simultaneously closing all of the openings in watertight compartments.

La Protection Sous-Marine Des Navires De Commerce (82021 B). Ills. 2400 w. Gen Civ—Sept. 29, 1917. Methods of protecting ships below water line.

**Safety Valves**

An Analysis of Marine Safety Valves (75006 A). E. F. Maas. Ills. 2000 w. A S M E, Jl—Dec., 1916. Analyzes certain characteristics. Suggestions.

Safety-Valve Springs (79189 F). William L. De Baufre. Ills. 30 pp. Am Soc Nav Engrs, Jl—May, 1917. Method of testing used at the Naval Engng. Experiment Station at Annapolis.

**Sailing Ships**

American Wooden Sailing Ships With Auxiliary Motors (78987 A). Ills. & Plate. 2000 w. Engng—May 11, 1917. Discusses proposed cargo carriers to be built and the type, construction, etc.
tion, etc

**Salvage**

Engineering Contractors Recover Stranded Submarine "H-3" (78912). Ills. 1200 w. Eng News-Rec—May 24, 1917. After naval plan of salvage fails, the hull is jacked out of sand and moved overland for repairs.

Raise Old Bark from African River (78381 A). Ills. 1000 w. Mar Rev—May, 1917. Manga Reva, bought for $5000, raised and repaired, sold for $300,000.

**Salvaging**

Salvaging the Sesostris (80368 A). Gilbert C. Dohm. Ills. 2500 w. Int Mar Eng—Aug., 1917. Reclaimed after ten years on beach of Guatemala.

Salvaging the Submarine H-3 (80957 A). Ills. 1000 w. Int Mar Eng—Sept., 1917. Stranded vessel lifted out of quicksand on the California coast.

**Schoolships**

State Nautical Schoolships (79063 A). Ills. 700 w. Int Mar Eng—June, 1917. Instruction in navigation and engineering.

**Seafaring Men**

A Call to American Seafaring Men (79696 A). Ills. 1800 w. Int Mar Eng —July, 1917. Navigators and engineers wanted; their training, etc.

**Shafting Failures**

Investigation of Shafting Failures and Engine Vibration on Vessels of the Louisiana Class (77303 F). Ernest N. Janson and J. O. Richardson. Ills. 35 pp. Am Soc Nav Engrs, Jl—Feb., 1917. Details of tests and conclusions.

**Shell Plating**

Mold Loft Notes (80956 A). T. L. Cohee. Ills. 2500 w. Int Mar Eng—Sept., 1917. Methods of developing shell plating.

**Shipbuilding**

Shipbuilding Work (74891). 1300 w. Times Eng Supp—Oct. 27, 1916. Account of work in progress in British yards.

The Advance in American Shipbuilding (75720 D). Ills. 4000 w. Iron Age—Jan. 4, 1917. Special No. Improvements in plants and methods.

Shipbuilding in the United States in 1916 (76519 A). Ills. 1200 w. Int Mar Eng—Jan., 1917. Over 500 merchant vessels under construction. 268 built in 1916.

Progress With Government Scheme (76929). 1300 w. Times Eng Supp—Jan. 26, 1917. Vessels ordered under new plan of Government control. Standardization, etc.

Progress of the Year (76922). 2000 w. Times Eng Supp—Jan. 26, 1917. Review of construction in different countries of the world in 1916.

Use of Southern Yellow Pine in Shipbuilding (76522 A). A. C. Powers. 1500 w. Int Mar Eng—Feb., 1917. Qualities which make it superior.

The New Status of American Shipbuilding (75719 D). W. L. Crounse. 4500 w. Iron Age—Jan. 4, 1917. Special No. Close second to Great Britain.

The Shipbuilding Position (76231). 1200 w. Times Eng Supp—Dec. 29, 1916. Conditions of working in British Yards, with reference to war vessels and others.

The Present Position and Prospects of American Shipbuilding (77120 A). J. W. Powell. Read before Nat. Foreign Trd. Council Con. 4000 w. Int Mar Eng—March, 1917. Summary of handicaps caused by adverse legislation.

Work at the Newport News Yard (77122 A). Ills. 900 w. Int Mar Eng—March, 1917. Contracts for nearly 200,000 tons of shipping.

American Shipbuilding and Shipping (78673 A). 1200 w. Engr—Apr. 27, 1917. Editorial review of past and present conditions of this industry.

Ames Shipbuilding and Dry Dock Company (78488 A). Gilbert C. Dohm. Ills. 1000 w. Int Mar Eng—May, 1917. New steel shipbuilding yard at Seattle.

Douglas Fir (Oregon Pine) Shipbuilding (78485 A). Howard B. Oakleaf. Ills. 2500 w. Int Mar Eng—May, 1917. Supply, properties and strength.

Wooden Motorship for West Indian Trade (78486 A). Ills. 400 w. Int Mar Eng—May, 1917. Details of design and principal dimensions.

Shipbuilding is Revived in South (78939 A). H. H. Dunn. Ills. 3000 w Mar Rev—June, 1917. Rapid growth of the industry.

Solving the Problem of the Ships (79059 A). George J. Baldwin. 2000 w. Int Mar Eng—June, 1917. The wooden and steel shipbuilding boom.

State Shipbuilding (79439). 4000 w. Times Eng Supp—May 25, 1917. New plans of the Admiralty, control of materials, etc.

Rapid Growth of Shipbuilding Plants (79845 A). 1500 w. Iron Age—July 12, 1917. Large extensions and improvements.

The Future of American Shipbuilding (79695 A). Arthur F. Johnson. 1800 w. Int Mar Eng—July, 1917. Predicts extensive future prosperity for the industry.

Shipbuilding Accidents (80371 A). 2500 w. Int Mar Eng—Aug., 1917. Serial, 1st part. Hazards and how they may be minimized.

Enclosed Shipbuilding Berth for Canadian Vickers, Ltd. (81022). Ills. 1400 w. Can Engr—Sept. 6, 1917. Speedy erection at Montreal of double berth 500 ft. long and 152 ft. wide.

Ferro-Concrete Shipbuilding (81960 A). Ills. 2200 w. Engng—Oct. 5, 1917. Serial, 1st part. Experience in the construction of such vessels in Scandinavia.

Standard Ships (82041). 1200 w. Times Eng Supp—Sept. 28, 1917. Design of a new Standard ship for merchant service by Great Britain.

The Development of Continental Shipping and Harbors (81852 A). 2500 w. Engng—Sept. 14, 1917. Editorial review of progress in this field in different countries.

Electrification of the Union Iron Works Plants (81795). Ills. 2500 w. Elec Rev & Wes Elec—Oct. 13, 1917. Equipment and lighting and power installation at San Francisco shipbuilding plant.

**Ship Conveyors**

See Conveyors, under MECHANICAL ENGINEERING, *Transporting and Conveying.*

**Ship Design**

Unsinkable Ships (80727). 1800 w. Times Eng Supp—July 27, 1917. Buoyancy, watertight subdivision, factor of stability, etc.

Standard Single-Screw Steel Steamship for U. S. Shipping Board's Emergency Fleet (80369 A). Ills. 1500 w. Int Mar Eng—Aug., 1917. Details of design.

**Shipping**

American Shipping and Shipbuilding (74775 A). E. T. Good. 1500 w. Cas Eng Mthly—Nov., 1916. Possibilities of future competition between the U. S. and Great Britain.

Lloyd's Register of Shipping (75140 A). 3000 w. Engr—Nov. 17, 1916. Information from report for 1915-16.

The British Shipping Situation (80782 A). 1000 w. Engng—Aug. 10, 1917. Editorial review of effects of the war.

**Ship Protection**

Per Un Naviglio Da Carico (78879 C + D). U. Pugliese. Ills. 9200 w. Riv Marit—Feb.-Mar., 1917. Suggested methods of protecting cargo vessels from submarine attack.

**Ship Railway**

Der Schiffsaufzug im Moldauhafen (76907 B). H. Laras. Ills. 1700 w. Zeit des Ver Deutsch Ing—Nov. 25, 1916. German ship-yard railway with electric locomotive for hauling ships out of water.

**Ships**

Special Composite Ship Construction (80370 A). M. F. Carr. Ills. 800 w. Int Mar Eng—Aug., 1917. Describes details.

**Ship Shed**

Large Steel-Frame Ship Shed Contains Special Trusses Designed for Vertical and Horizontal Crane Loading (74408). Ills. 1500 w. Eng Rec—Nov. 4, 1916. Cramp Ship Building Co.'s new building for heavy work.

**Ship Stresses**

Longitudinal Stresses of Ships (74502 A). Arthur Liddell. 2500 w. Engr—Oct. 20, 1916. Illustrative calculations.

**Ship Trim**

The Trim of Ships (74886). 1500 w. Times Eng Supp—Oct. 27, 1916. Discusses the effect of speed.

**Shipyards**

Man-Power In Shipyards (76228). 1700 w. Times Eng Supp—Dec. 29, 1916. How the rate of output of British yards might be improved.

Nos Chantiers De Constructions Navales (76251 B). E. Coustet. Ills. 5600 w. La Nat—Dec. 30, 1916. Principal shipyards of France. Development, equipment and important vessels built.

Production In Shipyards (78288). 2200 w. Times Eng Supp—Mar. 30, 1917. New State proposals. Organization, standard ships, etc.

Industrial Management Principles in Shipyard Practice (80814 A). William M. Kennedy. Ills. 5500 w. Ind Man—Sept., 1917. Application to many of the varied operations of a large shipyard.

**Shop Equipment**

Marine Machine Shop Equipment (77832 A). W. D. Forbes. 2200 w. Int Mar Eng—April, 1917. Tools required.

**Signaling**

Submarine Signaling—Fessenden Oscillator (77308 F). H. J. H. Fay. Ills. 4000 w. Am Soc Nav Engrs, Jl—Feb., 1917. Devices used for signaling.

**Speed**

The Speed of Ships (82036). 2000 w. Times Eng Supp—Sept. 28, 1917. Determining conditions for both war vessels and merchant ships. Armament, weight of boilers and machinery, etc.

**Speed Trials**

Ship-Trials (78868). 1100 w. Times Eng Supp—Apr. 27, 1917. Relation of trial speeds to average service performance of ships. Many vessels fail to show expected speed.

**Stability**

Apparatus for Determining Ship Stability (78208 A). Thomas Graham. Read before Instn Nav Archts. 2500 w. Engng—March 30, 1917. Apparatus which shows the stability graphically.

Apparatus for Interpreting Stability for the Use of Shipmasters (81562 A). Thomas Graham. Ills. 2000 w. Int Mar Eng—Oct., 1917. Apparatus for showing graphically the stability under ordinary conditions of loading.

On the Analysis of the Results of Inclining Experiments (81853 A). C. Frodsham Holt. Ills. 1700 w. Engng—Sept. 28, 1917. Shows how a particular type of error may be eliminated.

**Standardization**

Standardization as Applied to the Machinery for Cargo Boats (78198 A). D. B. Morison. Read before the Inst. Nav. Archt. 4000 w. Mech Engr—April 6, 1917. Favoring and showing possibilities.

Standardization as Applied to the Machinery for Cargo Boats (79061 A). D. B. Morison. 2500 w. Int Mar Eng—June, 1917. Possibilities of standardized manufacture as applied to cargo boat engines, boilers, and auxiliaries.

**Steamships**

The Steamship Milazzo (77419 A). Plate. 1800 w. Engr—March 2, 1917. Interesting merchant ship intended chiefly for the transport of coal and petroleum.

Geared Turbine Passenger Steamship Maui (77828 A). Ills. 1800 w. Int Mar Eng—April, 1917. Built for Hawaiian service.

Pioneer Steamships on the Great Lakes (77737 A). Frank R. Rosseel. Ills. 3000 w. Mar Rev—April, 1917. Steamers, conditions and events of the first 15 years of steam navigation on the lakes.

The Cunard Liner "Aurania" (79975 A). Plates. 4000 w. Engng—June 29, 1917. Details of one of the latest ships for North Atlantic service.

Hough Type Wooden Steamship (80954 A). Ills. 1800 w. Int Mar Eng—Sept., 1917. Designed by Edward S. Hough for the U. S. Shipping Board.

**Steel Ships**

Cast Steel Ships (81563 A). Myron F. Hill. Ills. 1000 w. Int Mar Eng—Oct., 1917. Details of construction, and their advantages.

Specifications for U. S. Steel Ship (81473 A). Ills. 5000 w. Mar Rev—Oct., 1917. Serial, 1st part. Complete description of the hull and propelling machinery requirements of the standard

7300-ton steel steamer approved by the Shipping Board Emergency Fleet Corps.

**Submarine Chasers**

Building Submarine Chasers by Standardized Methods (80352 B). Henry R. Sutphen, with discussion. Ills. 2500 w. S A E, Jl—July, 1917. Account of the work.

**Submarine Hunting**

Checking the Submarine Menace with Aircraft (79174 A). Henry Woodhouse. Ills. 1000 w. Flying—June, 1917. Believes that aircraft is the most successful means.

**Submarine Mower**

Getting Potash Kelp with a Submarine Lawn Mower is a War Industry (81571). Ills. 700 w. Am Mach—Oct. 4, 1917. Mower used on the Pacific coast for cutting and gathering kelp.

**Submarines**

The Fleet Submarine (75379 B). F. A. Daubin. 3500 w. U S Nav Inst, Pro—Nov.-Dec., 1916. Advantages.

On the Suitability of Current Design of Submarines to the Needs of the United States Navy (77174 A). W. L. Rodgers. Read in N. Y., before Soc. of Nav. Archts. & Marine Engrs. Also editorial. 5000 w. Engr—Feb. 16, 1917. Offensive and defensive capabilities of submarines, and means of overcoming them.

I Sommergibili (77566 C + D). A. G. Rosso. 10400 w. Riv Marit—Dec., 1916. Accomplishments of submarines.

I Sommergibili (78250 C + D). A. G. Rosso. 4800 w. Riv Marit—Jan., 1917. Their function in blockading. Continuation of (77566 C + D) in preceding issue.

The Submarine (77756 A). C. H. Bedell. Ills. 6500 w. A S M E, Jl—April, 1917. History, construction, operation, etc.

Le Moteur Unique Dans La Navigation Sous-Marine (78293 B). Ills. 4900 w. Gen Cir—Mar. 31, 1917. Development of motor for submarines.

Buoyancy and Stability of Submarines (78374 N). William Hovgaard. Curves. 16 pp. Instn Nav Achts—March 29, 1917. Important problems. Relations between buoyancy, weight and stability.

Buoyancy and Stability of Submarines (78579 A). W. Hovgaard. Read before Instn. of Nav. Archts. Ills. 5500 w. Engr—Apr. 13, 1917. The more important problems—particularly the relations between buoyancy, weight and stability.

Submarines (78708). John G. Callan. Ills. 2500 w. Wis Engr—April, 1917. Outlines the main features of these vessels and the control.

The Submarine Problem (79451 A). 1200 w. Ind Man—July, 1917. Editorial giving analysis of existing conditions.

La Guerre Sous-Marine (79421 B). Ills. 3300 w. La Nat—June 2, 1917. Types of submarines and kinds of air and sea craft employed to engage them.

Submarines in the Adriatic (78989 A). Ills. 1500 w. Engr—May 11, 1917. Information concerning the types and the salvage of the U C 12, a German submarine mine-layer.

The Inception and Development of the Submarine Boat (79078 A). John P. Holland, Jr. Ills. 2200 w. E Cb Phila, Pro—June, 1917. Historical review from the earliest attempts.

A Submarine of One Hundred and Twenty Years Ago: Invented by Robert Fulton (79700 A). F. B. C. Bradlee. Ills. 1000 w. Int Mar Eng—July, 1917. An account of Fulton's experiments.

The Real Problem of the Submarine (79906). 1500 w. Am Mach—July 12, 1917. The problem of eliminating the submarine.

The Submarine (80105 A). Gates Stirling. 20 pp. U S Nav Inst, Pro—July, 1917. History of development.

Submarines in Periodical Literature from 1911 to 1917 (80566 B). Helen R. Hosmer. 55 pp. Fkn Inst, Jl—Aug., 1917. Outline of publications showing the general status of current knowledge on the subject. Also bibliography.

La Flottabilité Et La Stabilité Des Sous-Marins (81404 B). Ills. 4800 w. Gen Civ—Aug. 25, 1917. Mathematical analysis of the conditions of stability of submarines.

The Submarine and Kindred Problems (81462). 3500 w. Am Mach—Sept. 27, 1917. Plans of the Naval Consulting Board for assisting the Government.

The Submarine and Kindred Problems (81506). 3000 w. Min & Sci Pr—Sept. 29, 1917. Abstract of bulletin issued by U. S. Naval Consulting Board.

I Sommergibili (76200 C + D). G. A. Rosso. 4400 w. Riv Marit—Oct., 1916. Rights and privileges of submarines in warfare. Review of agreements by different nations.

La Questione Del Motore Unico (76240 C + D). D. Cardile. Ills. 5800 w. Riv Marit—Nov., 1916. Consideration of the best kind of motor for submarines.

Sur La Rèsistance Des Coques Sous-Marins (76234 B). M. Zack. 1000 w. Gen Civ—Dec. 16, 1916. Mathematical treatment of subject of a submerged section, and design of its contour.

**Submarine Warfare**

Two Years of Submarine Warfare (74500 A). 3000 w. Engr—Oct. 20,

1916. Serial, 1st part. Review of the accomplishments and failures.

**Suction Dredge**

Zelfladend zuigbaggervaarting 'Sumatra" (78854 B). F. Smit. Ills. 3900 w. Ingr—Mar. 31, 1917. Powerful suction dredge, 279 ft. long, for improving harbor entrance at Belawan, Dutch East Indies.

**Superheating**

Superheating Marine Operations (82024). 1000 w. Naut Gaz—Oct. 11, 1917. Advantages of superheating for marine engines.

**Tonnage**

Nolo Portata E Stiva Nei Bastimenti (76201 C + D). A. Scribanti. 5200 w. Riv Marit—Oct., 1916. Formulas showing ratio of tonnage capacity to displacement with different cargoes and freight rates.

**Torpedo Craft**

German Torpedo Craft in the War (75630 A). Ills. 3300 w. Engr—Dec. 8, 1916. Critical discussion of the causes of failure of these boats.

Torpilleurs Allemands Et Destroyers Anglais (76246 B). Ills. 3200 w. Gen Civ—Jan. 6, 1917. Description, comparative numbers and equipment of German torpedo boats and English destroyers.

**Towboats**

Pushing and Speed Tests of River Towboats (76524 A). M. von Pagenhardt. 2500 w. Int Mar Eng—Feb., 1917. Speed and thrust of tunnel stern towboat with propellers of varying pitch and area.

**Towing**

Towing the United States Collier Maumee from Mare Island to New York (76523 A). Frank A. Stanley. Ills. 3000 w. Int Mar Eng—Feb., 1917. Naval collier towed in 26 days steaming time.

Towing Costs on Western Rivers (80955 A). M. von Pagenhardt. Ills. 2500 w. Int Mar Eng—Sept., 1917. Investigation of factors influencing the cost.

**Train-Ferry**

The Construction and Operation of a Temporary Train-Ferry on the Orange River at Upington, South Africa (81198 N). Jamese Merriman Greathead. Ills. 10 pp. Instn C E—No. 4179. Used to facilitate work of railway construction.

**Turning-Gears**

Turning-gears for Marine Geared-turbine Machinery (78663 A). Ills. 1500 w. Mech Wld—May 4, 1917. Serial, 1st part. Principles and methods of design.

**Twin Screws**

On the Differences in Effect of Twin Screws When Turning "Inward" or "Outward" (78826 A). C. H. Holst. 3800 w. Engng—May 4, 1917. Study of propeller efficiency.

**U .S. Navy**

The Development of Our Fleet and Naval Stations (76463 A). W. L. Cathcart. (Abridged.) Map & Ills. 7000 w. A S M E, Jl—Feb., 1917. Why we need a great navy; strategic situations; needs of naval stations, etc.

The United States Navy (76553 A). 2500 w. Engr—Jan. 19, 1917. Information from the annual report, with comments.

La Marine De Guerre Des États-Units (77606 B). 5200 w. Gen Civ—March 10, 1917. Comparison of United States Navy with those of other powers.

The Development of Our Fleet and Naval Stations (77140 A). W. L. Cathcart. Abstract of address before Schenectady Soc. of A. I. E. E. Maps. 6500 w. Gen Elec Rev—March, 1917. Review of conditions in U. S. Navy, showing unpreparedness.

The First Naval Training Cruise: Its Accomplishment and Portent (77407 A). W. B. Tardy. 52 pp. U S Nav Inst—March, 1917. With an appendix covering all important points of the cruise of 1916 and suggestions for future training.

Electrical Opportunities in the Navy (77724). Ills. 1200 w. Elec Rv & Wes Elec—March 31, 1917. Uses of electricity on board ship. Training given.

**War Boats**

England's Yankee-Built War Boats (77730 A). Robert E. Power. Ills. 1200 w. Mar Rev—April, 1917. Fleet of 80-ft. power craft effective against German submarines.

**Warship Design**

The Capital Ship of the Future (74807 A). 3000 w. Engr—Oct. 13, 1916. Features of design, from experiences gained in this war.

**Warships**

Recent American Warships (76145 A). Plate. 4500 w. Engr—Jan. 5, 1917. Serial, 1st part. Details of the most interesting vessels.

**Water Gages**

Water Gages on Marine Boilers (82226). W. M. McRobert. Ills. 2500 w. Power—Nov. 6, 1917. Types of water columns and gages used on marine boilers, pointing out where and how they will give trouble.

**Wave Motion**

Bassin d'Essai Permettant de Reproduire le Mouvement des Vagues (75593 B). R. Bonnin. Ills. 1300 w. La Nat —Nov. 18, 1916. Experimental tank, for studying effects of wave motion on models.

Theory of Wave Motion on Water (78376 N). George Greenhill. 21 pp.

Instn Nav Archts—Mar. 29, 1917. The Rankine solution is discussed.

**Waves**

Neuere Beobachtungen über die kritischen Umlaufzahlen von Wellen (74912 B). A. Stodola. Ills. 3400 w. Serial, 2 parts. Schweiz Bau—Oct. 28, and Nov. 4, 1916. Mathematical discussion of effect of propeller speed on waves produced by a moving vessel.

**Welding**

Welding in Ship Construction (81423). 1000 w. Times Eng Supp—Aug. 31, 1917. Advantages of the American plan to use castings, welded together.

**Wooden Ships**

Standard Wooden Steamships for United States Shipping Board Emergency Fleet (79697 A). Ills. 3500 w. Int Mar Eng—July, 1917. Plans and specifications of standard type, 3500-ton wooden cargo steamer.

The Problem of the Wooden Ship (79874). F. Huntington Clark. Ills. 1500 w. Mfrs' Rec—July 12, 1917. Statement of proposed construction of wooden ships and the present situation.

Wooden Ships of Hough Design Could Be Built in Short Time (79875). Ills. 1500 w. Mfrs' Rec—July 12, 1917. Explains advantages of the Hough plan in contrast with others.

How Wooden Ships Are Built (78937 A). H. Cole Estep. Ills. 2000 w. Mar Rev—June, 1917 Serial, 1st part. Typical methods of construction.

Wooden Ships and the Submarine Menace (79060 A). William T. Donnelly. Ills. 1000 w. Int Mar Eng—June, 1917. Vessel unsinkable by loading cargo in watertight containers.

**Wreck**

The Wreck of the U. S. S. De Soto (79356 A). David A. Hall. 10 pp. U S Nav Inst, Pro—June, 1917. Accident due to tidal wave caused by earthquake.

**Yachts**

Turbine Steam Yacht Winchester (76526 A). E. A. Stevens, Jr. Ills. 1000 w. Int Mar Eng—Feb., 1917. Particulars and trial data.

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## AERONAUTICS

**Aerial Navigation**

Aerial Navigation Over Water (76038 B). Elmer A. Sperry. Ills. 13 pp. S A E, Bul—Dec., 1916. Limitations of the magnetic compass, and description of an instrument of precision that will function as a compass.

Aeronautics in 1916 (76147 A). 2200 w. Engr—Jan. 5, 1917. Progress in aeroplanes and airships.

Aerial Navigation Over Water (77795 A). Elmer A. Sperry. Ills. 4000 w. Flying—April, 1917. Limitation of the magnetic compass, and the value of the gyroscopic compass.

**Aerodromes**

Provisions to Be Made in City Planning to Facilitate Aerial Transportation (75828 A). Henry Woodhouse. Address to Am. Civ. Serv. Assn. Ills. 2500 w. Flying—Jan., 1917. Need in every city of aerodromes, terminals and arrangements for aircraft.

**Aerodynamics**

Long Tails vs. Short Tails in Aerodynamics (77426). G. H. Bryan and S. Brodtesky. 1000 w. A A Wkly—March 19, 1917. Mathematical study.

Een gewijzigd vliegtoestel (77571 B). D. W. Gijswijt. Ills. 2600 w. Ingr—Feb. 3, 1917. Analytical treatment of forces acting on a plane of new design.

**Aero Engines**

American Aero Engines (76710). Ills. 4500 w. A A Wkly—Feb. 12, 1917. Brief descriptions of types.

Recent Developments in Aviation Engines (76947). Allison F. H. Scott. Ills. 3000 w. Wis Engr—Feb., 1917. Résumé of recent advancements.

Some Notes on High-Pressure Aviation Engines (76784). Leigh M. Griffith. Read before S. A. E. 4000 w. A A Wkly —Feb. 19, 1917. Outlines reasons for believing in the superiority of these engines for aeronautics.

The 160 H. P. Benz Aero Engine (77084). Ills. 1500 w. A A Wkly—March 5, 1917. A German aviation engine.

The German Aeroplane Engine Trials (77423). Ills. 3500 w. A A Wkly—March 19, 1917. Detailed description of the equipment and proceedings.

Aero Engines Will Be All Steel (78902). Chares E. Lucke. 6000 w. Auto—May 24, 1917. Analysis of the aeroplane engine problem.

The G. V. Monosoupape Gnome (78527). Ills. 1500 w. A A Wkly—May 7, 1917. Details of engines built in America.

Aircraft Engine Design (79302 A). Louis Coatalen. Also editorial. 6500 w. Mech Engr—May 25, 1917. Abstract of paper before Aeronautical Soc. of Gt. Britain. Desirable characteristics.

Details of German Aviation Engines (79325). E. H. Sherbondy. 5500 w. Auto—June 21, 1917. Extracts from paper before the Cleveland Sec. of S. A. E. Analysis of the details of new engines.

Factors in Aviation Engine Design (79224). Louis Coatalen. 2500 w. Auto —June 14, 1917. Serial, 1st part. How aviation engine differs from other gasoline motors.

Aero and Motor-Car Engines (79440). 2700 w. Times Eng Supp—May 25, 1917. Contrasts in design. Weight, materials, lubrication, etc. Abstract of paper by L. Coatalen before Aeronautical Soc.

Recent Discussion on Airplane Engines 79525). 3500 w. Power—June 26, 1917. Excerpts from recent papers by various authors.

British Aircraft Engines of High Output (79946 A). Ills. 400 w. Engr—June 22, 1917. Latest Sunbeam types described.

Duesenberg Motor For Training Planes (79767). Ills. 1800 w. Auto—July 5, 1917. Compactness and liberal bearing area chief characteristics.

Building Gnome Airplane Engines (79880). P. M. Heldt. Ills. 3500 w. Auto—July 12, 1917. Serial, 1st part. Types of airplane engines being produced in the United States.

Details of German Aviation Engines (79629). E. H. Sherbondy. 6000 w. A A Wkly—July 2, 1917. Features of the latest design.

**Aeromotor**

New Thomas 135 H.P. Aeromotor (74836 A). Raymond Ware. Ills. 800 w. Sib Jl Eng—Nov., 1916. Small bore, high speed, eight cylinder V-type.

The 120 H. P. Six-Cylinder Union Aeromotor (79784). Ills. 2500 w. A A Wkly—July 9, 1917. General description with test data.

**Aeronautics**

Scientific Research for National Defense as Illustrated by the Problems of Aeronautics (76196 B). George O. Squier. 1800 w. Fkn Inst, Jl—Jan., 1917. Problems of military aviation and aerostation.

Progress In 1916 (76927). 3000 w. Times Eng Supp—Jan. 26, 1917. Review of development of planes and dirigibles, design of motors and report of Committee on Royal Flying Corps.

Linking the Nations of the Western Hemisphere—Solving Difficult Problems of Transportation and Protecting the Monroe Doctrine with Aircraft (76646 A). Santos-Dumont. Map. 3000 w. Flying—Feb., 1917. Predictions for important development of air fleets.

The British Air Ministry—Great Britain's Latest Move to Achieve Command of the Air (76647 A). Robert E. Peary. Ills. 3000 w. Flying—Feb., 1917. Establishment of an Air University.

The Evolution of Pan-American Aeronautics (76648 A). Augustus Post. Ills. 6000 w. Flying—Feb., 1917. Account of the Pan-American movement.

Commercial Aeronautics (79592 A). Ills. 1100 w. Engr—June 8, 1917. Reviews address of Holt Thomas before the Aeronautical Soc. of Gt. Britain. Outlines scheme of utilizing, aircraft, estimating cost.

Aeronautics of the Future (79979 A). 1500 w. Engng—June 29, 1917. Editorial review of Mervyn O'Gorman's Wilbur Wright Memorial Lecture.

Research In Aeronautics (80735). 1300 w. Times Eng Supp—July 27, 1917. Report of British Advisory Committee for Aeronautics. Experimental researches.

Aeronautics in the Future (81529 B). Mervyn O'Gorman. Ills. Fifth Wilbur Wright memorial lecture. 5500 w. S A E, Jl—Sept., 1917. Prejudices; future of commercial aeronautics; future production of air craft, etc.

Atlantic to be Crossed Within Few Months and Difficult Problem of Delivering Aeroplanes to Europe Solved (81691 A). Alan R. Hawley. Ills. 1800 w. Flying—Oct., 1917. Course guided by radio direction finders. Plans for trans-Atlantic flight.

Theory of Pressure on a Plane Surface Due to Relative Wind (81474). A. E. Watson. Ills. 2500 w. A A Wkly—Oct. 1, 1917. Serial, 1st part. A study of the application of the principle of air pressure.

**Aeroplanes**

American Aeroplanes (76709). Ills. 2500 w. A A Wkly—Feb. 12, 1917. Brief descriptions of types.

Large Aeroplanes (77586). 800 w. Times Eng Supp—Feb. 23, 1917. Advantages of increased size discussed by F. H. Page before British Aeronautical Society.

Les Aeroplans Allemands Biplane De Types Recants (77593 B). Ills. 3400 w. Gen Civ—March 3, 1917. Recent types of German biplanes. Rumpler, L. V. G., Aviatik and Albatross described.

The 1916 Type Rumpler Biplane (77424). Ills. 1000 w. A A Wkly—March 19, 1917. Detailed description.

Method of Selection of an Aeroplane Wing as to Area and Section (78748). J. A. Roché. Diagrams. 1500 w. A A Wkly—May 21, 1917. Serial, 1st part. Explains a method found satisfactory.

American Aeroplanes and Motors Equal to Europe's Best (78609 A). Ills. 4000 w. Flying—May 1, 1917. Efficiency.

Submarine Hunting by Aircraft (78608 A). Henry Woodhouse. Ills. 4000 w. Flying—May, 1917. Excerpts from a forthcoming book.

Swept Back Wings (79359). H. E. Rossell and C. L. Brand. Ills. 1700 w. A A Wkly—June 25, 1917. Abstract from a research submitted for the degree of Master of Science in the Dept. of Naval Archt., at Mass. Inst. of Tech.

Notes on the Truing of Aeroplanes (79931). Ills. 1800 w. A A Wkly—July

23, 1917. Fundamental principles to be observed.

Dropping Bombs From Aeroplanes (80693). Jean-Abel Lefrance. Ills. 2200 w. A A Wkly—Aug. 27, 1917. Details of an instrument employed by the Germans.

Germany's Latest Aeroplanes (80458). Ills. 3000 w. AA Wkly—Aug. 13, 1917. Particulars compiled by Mons. Jean Lagorgette.

Classes and Uses of Battleplanes (80351 B). Amaury de la Grange, with discussion. 3500 w. S A E, Jl—July, 1917. Types in use, production, tests, etc.

The Gotha Twin-Engine Military Plane (80767). Ills. 1400 w. Auto—Aug. 23, 1917. Carries three persons, mounts three machine guns, and has an automatic bomb dropper.

The Warplane for Bombing and Torpedo Attacks (80337 A). Henry Woodhouse. Ills. 6000 w. Flying—Aug., 1917. A new aerial weapon. Excerpts from book on military aeronautics.

Instructions For Assembling Curtiss Standard JN4-B Aeroplanes (80607). Ills. 2500 w. A A Wkly—Aug. 20, 1917. Serial, 1st part. Packing, handling, methods, etc.

The Speed of Aeroplanes at High Altitudes (80610). Harlan D. Fowler. 1500 w. A A Wkly—Aug. 20, 1917. Variation required with height, and sources of improvement.

Aerial Bombardment (81069 A). Ills. 1500 w. Engng—Aug. 24, 1917. Details of one of the German bombing aeroplanes.

**Aircraft**

Methods of Measuring Aircraft Performances (77868). H. T. Tizard. 3000 w. A A Wkly—April 9, 1917. Serial, 1st part. Preliminary remarks. Methods of testing.

The Problems of Cross-Atlantic Flying (78088 N). L. Blin Desblads (Abridged). 2000 w. Instn E & S Scot—March, 1917. Importance of aircraft to the future of British shipping.

Design and Production of Aircraft in War Time (79135 B). I. W. Seddon. 1200 w. S A E Bul—May, 1917. Uurges the encouragement of original designing.

How United States Builds for Air Supremacy (79881). Ills. 2000 w. Auto—July 12, 1917. Purposes of the Aircraft Production Board.

Design and Production of Aircraft in Time of War (80350 B). J. W. Seddon, with discussion. Ills. 2500 w. S A E, Jl—July, 1917. Methods of improving the fighting airplane.

Géants Et Pygmées De L'Air (80748 B). J. A. Lefrenc. Ills. 1800 w. La Nat—Aug. 4, 1917. Recent German battleplanes. Design and dimensions.

The Standard J-R Pursuit Aeroplane (80305). Ills. 700 w. A A Wkly—Aug. 6, 1917. Detailed description.

Aircraft Production—A Little Friendly Warning (81433 A). 400 w. Ind Man—Oct., 1917. Editorial on G. S. Radford's article. Difficulties to be overcome to secure satisfactory plans for war service.

Methods of Measuring Aircraft Performances (81070 A). H. T. Tizard. Read before Aeronautical Soc of Gt. Britain. 6000 w. Engng—Aug. 24, 1917. The scientific testing of aeroplanes.

Nieuport "Plane-and-a-Half" Speed Scout (81767). Ills. 1500 w. Auto—Oct. 11, 1917. Principal French fighting machine.

Problems Considered at Aircraft Meeting (81605). P. M. Heldt. Ills. 6000 w. Auto—Oct. 4, 1917. Specifications and tests recommended.

**Aircraft Signalling**

Directing Artillery Fire by Night and Day Signalling to and from Aircraft (80952 A). Henry Woodhouse. Ills. 2500 w. Flying—Sept., 1917. Excerpts from a new book on "Military Aeronautics."

**Airplane Problems**

Some Problems in Airplane Construction (76034 B). V. E. Clark, T. F. Dodd, and O. E. Strahlmann. Ills. 24 pp. S A E, Bul—Dec., 1916. Important problems in the construction of airplanes for military use.

**Airplanes**

Airplane Progress in France and Germany Since 1914 (81764). W. F. Bradley. Ills. 2500 w. Auto—Oct. 11, 1917. Reviews the most successful machines and the tactics of the air forces of the two armies.

Building a Military Training Airplane (81569). Fred H. Colvin. Ills. 4000 w. Am Mach—Oct. 4, 1917. Details of manufacture of one type.

Possibilities of Rapid Growth in Airplane Work (81689). Fred H. Colvin. 1000 w. Am Mach—Oct. 11, 1917. Shows what can be done in a new plant when parts are standardized.

Sheathing and Balancing Airplane Propellers (82062). George B. Fuller. Ills. 1800 w. Auto—Oct. 25, 1917. Methods of balancing propellers; object of sheathing.

Women in Airplane Production (81974). I. William Chubb. Ills. 1500 w. Am Mach—Oct. 25, 1917. How women are utilized on British airplane work.

**Air Resistance**

Experimental Researches on the Resistance of Air (78611). L. Marchis. 6500 w. A A Wkly—May 14, 1917. Experimental methods; laboratories of France.

**Air-Screws**

The Whirling and Transverse Vibrations of a Rotating Air-Screw and Its Shaft (80397 A). A. Fage. 2500 w. Engng—July 20, 1917. Mathematical investigations.

**Air Service**

What Must Be Done to Build Up a Substantial Air Service to Meet the National Emergency (77796 A). Alan R. Hawley. 2500 w. Flying—April, 1917. Possibilities of increase.

**Air Transport**

Commercialized Air Transport (82079). Harlan D. Fowler. 2500 w. A A Wkly—Oct. 29, 1917. Progress made and the future outlook.

Per L'Aeronariglio Mercantile (82010 C + D). G. Rabbeno. 1600 w. Riv Marit—July, 1917. Discussion of the prospect of a mercantile air fleet in near future.

**Anti-Air Craft Guns**

Hulpinrichting voor het snel en juist richten van een antiluchtvaartkanon (79416 B). J. K. E. Triebart. Ills. 2900 w. Ingr—May 19, 1917. Instrument for getting the range and angle of elevation for anti-air craft guns.

Anti-Aircaft Weapons (79340 B). Elmer J. Wallace. Ills. 33 pp. U S Art, Jl—May-June, 1917. General discussion of attacks of aircraft by aircraft, and attacks from the earth.

**Aviation**

Military Aviation (76493). 4000 w. A A Wkly—Feb. 5, 1917. Serial, 1st part. Study prepared in the War College division.

The Training in Military Aviation (77425). W. S. Brancker. 3000 w. A A Wkly—March 19, 1917. Serial. 1st part. Lecture before British Aeronaut. Soc.

The Mechanical Development of Aviation (77757 A). Neil MacCoull. Ills. 4500 w. Abstract of paper before the Phila Soc A S M E, Jl—April, 1917. A review of the development and improvement of aeroplane power plants and other mechanical parts.

A History of Aviation (78713 B). Charles M. Manly. 3000 w. S A E Bul—April, 1917. Review of early research methods and experimental work.

Airplane Standards Needed (78900). W. F. Bradley. Ills. 2000 w. Auto—May 24, 1917. Disadvantages of many types of aviation engines.

Dieci Anni Di Aviazione (78878 C + D). A. Guidoni. Ills. 2100 w. Riv Marit—Feb.-Mar., 1917. Review of ten years of progress in aviation.

The Great Canadian Aviation Camp (80416). Fred H. Colvin. Ills. 2500 w. Am Mach—Aug. 9, 1917. Serial, 1st part. Deals with the training of military aviators.

Meteorology and Aviation (80718 A). W. H. Dines. 1200 w. Nature—July 26, 1917. A study of atmospheric phenomena as applied to aviation.

Motorists and the Air (80959 A). Charles L. Freeston. 2500 w. Autocar—Aug. 18, 1917. Aeroplane training.

Aviation as Applied to the Navy (81929 B). George D. Murray, with discussion. 17 pp. Bos Soc C E, Jl—Oct., 1917. Development and uses.

The Handicap of the Wind (81641). F. W. Lanchester. Ills. 1200 w. A A Wkly—Oct. 8, 1917. Explains difficulties due to adverse meteorological conditions, and how they can be overcome.

**Aviators**

The Government's Plans for Training Military Aviators (79173 A). Howard E. Coffin. 1000 w. Flying—June, 1917. Work of the Aircraft Production Board.

Medical and Physical Tests For Aviators (80307). Ills. 2000 w. A A Wkly—Aug. 6, 1917. Standards required.

**Battleplanes**

The World's Latest Battleplanes (79272). Henry Woodhouse. Ills. 2000 w. A A Wkly—June 18, 1917. Characteristics of German machines, with description of the Curtis triplane.

La Technique Allemande De L'Armement Aérien (82031 B). J. A. Lefranc. Ills. 3400 w. La Nat—Oct. 6, 1917. Armament and its disposition on the leading types of planes used by Germany. Control, direction of fire, etc.

**Biplane**

The Wright-Martin Model V (76492). Ills. 2500 w. A A Wkly—Feb. 5, 1917. Two-place tractor biplane equipped with Hispano-Suiza motor.

The 1916 Type German Aviatik Biplane (78526). Ills. 900 w. A A Wkly—May 7, 1917. Details and dimensions.

The Albatros D. 1. "Chaser" Biplane (80206). Ills. 800 w. A A Wkly—July 30, 1917. Details of this German machine.

The German Gun-Tunnel Gotha (81301). Ills. 700 w. A A Wkly—Sept. 24, 1917. Details of the equipment.

The German Halberstadt Biplane (81082). Ills. 1000 w. A A Wkly—Sept. 17, 1917. Critical discussion of its value.

**Biplane Wings**

The Stagger and Camber of Biplane Wings (77639). Paul A. G. Kauffmann. Ills. 1500 w. A A Wkly—March 26, 1917. Experimental studies.

**Carbureters**

Zenith Carbureter Production Increasing (80993). J. Edward Schipper. Ills. 1000 w. Auto—Sept. 6, 1917.

**Chicago-New York**

Chicago-New York by Air (75073 A). Ills. 4000 w. Flying—Dec., 1916. Flights of Victor Carlstrom and Ruth Bancroft Law.

**Coast Fortifications**

Anti-Aircraft Defenses for Coast Fortifications (80878). Thomas Ashburn. Ills. 2500 w. A A Wkly—Sept. 3, 1917. Conditions to be met; objects of air fleet; controlling principles in locating anti-aircraft emplacements, etc.

**Curtis Cruiser**

The Curtiss Flying Cruiser (77083). Ills. 1500 w. A A Wkly—March 5, 1917. Dimensions and details.

**Dirigibles**

Specifications for Navy Dirigibles (77085). Ills. 4500 w. A A Wkly—March 5, 1917. Complete specifications showing latest practice.

**Engine Cylinders**

The Metallurgy of Cast Iron Aeroplane Engine Cylinders (82078). F. W. Adams. Ills. 1700 w. A A Wkly—Oct. 29, 1917. Shows how the mixtures and processes are regulated in order to give the best results.

Aircraft and Motor Car Engine Design (79785). Louis Coatalen. Ills. 4000 w. A A Wkly—July 9, 1917. Serial, 1st part. Contrasted from the standpoint of a designer and manufacturer of both types.

Raising the Mean Effective Pressure (79617). P. M. Heldt. 1500 w. Auto—June 28, 1917. High M. E. P. aimed at in airplane engines.

Aircraft and Motor-Car Engine Design: Contrasted From the Standpoint of a Designer and Manufacturer of Both Types (80793 A). Louis Coatalen. 8800 w. Roy Soc Arts, Jl—Aug. 10, 1917. Characteristics of each; influence of service experience, materials, etc.

**Engineers**

The Training of Aeronautical Engineers (80459). R. Mullineux Walmsley. Lecture before Aeronautical Soc. of Gt. Britain. 5000 w. A A Wkly—Aug. 13, 1917. Serial, 1st part. Preliminary and technical training.

**Engine Repairs**

Airplane Engine Repairs at Toronto (80935). Fred H. Colvin. 2500 w. Am Mach—Sept. 6, 1917. How engines are kept in repair at the new shops of the Royal Flying Corps.

**Engines**

The Knox 300-H.P. Aero Engine (74711). G. Douglas Wardrop. Ills. 2500 w. A A Wkly—Nov. 20, 1916. General description and test under trying conditions.

Packard Aviation Engine 4 by 2 (76328 A). Ills. 1000 w. Auto—Jan. 25, 1917. New 12-cylinder engine for aeroplanes and airships.

The Rowe Le Gaucear Aeroplane Engine (76044). Ills. 500 w. Wis Engr—Dec., 1916. Design and operation.

The Sturtevant Model 5A, 140 H. P., Aeronautical Engine (75780). Ills. 2000 w. A A Wkly—Jan. 8, 1917. General description.

The Zeppelin Engines (75639 A). Ills. 4000 w. Autocar—Dec. 16, 1916. Details of the 200 h.p. Maybach engine as fitted to the German airships.

Zeppelin Power Plant Engineering (76102). Ills. 3000 w. Auto—Jan. 18, 1917. Serial, 1st part. Details of German aircraft engine construction.

The 200 H.P. Maybach Engine (77869). Ills. 2500 w. A A Wkly—April 9, 1917. Serial, 1st part. Unusual fittings, the engine and accessories.

The Air-Cooled Aero Engine (80796 A). Granville E. Bradshaw. 1500 w. Autocar—Aug. 11, 1917. Its advantages in respect of prime cost, weight, consumption and vulnerability.

The 260 h.p. Mercedes Aircraft Engine (80794 A). Ills. 1600 w. Autocar—Aug. 11, 1917. Particulars of the power unit of the twin-engined Gotha aeroplanes.

The Hall-Scott Airplane Engine (80863). P. M. Heldt. Ills. 3000 w. Auto—Aug. 30, 1917. Overhead camshaft type, with two valves per cylinder.

The 260 H.P. Mercedes (81083). Ills. 2500 w. A A Wkly—Sept. 17, 1917. Serial, 1st part. Details of twin engines taken from a captured three-seater "Gotha" biplane of the pusher type.

The 260 H.P. Mercedes Engine (80989). Ills. 2500 w. Auto—Sept. 6, 1917. Serial, 1st part. Latest type of German aircraft engine.

Aviation Engine with New Features (81898). Ills. 1000 w. Auto—Oct. 18, 1917. Design for aluminum 12-cylinder motor.

Final Tests of U. S. Aviation Engine (81525 B). 1800 w. S A E, Jl—Sept., 1917. Information concerning its development and tests.

Aviation Engine Development (81528 B). E. H. Sherbondy. Ills. 6500 w. S A E, Jl—Sept., 1917. Early French development, difficulties of construction, recent engines, sizes, etc.

Airplane Engine Production Methods (81477). P. M. Heldt. Ills. 2000 w. Auto—Sept. 27, 1917. Manufacture of an airplane four-cylinder engine with individual cast-iron cylinders.

Development and Progress in Aviation Engines (81701 B). Henry Souther. Ills.

18 pp. Fkn Inst, Jl—Oct., 1917. Reviews progress and requirements.

**Engine Trials**

The German Aeroplane Engine Trials (77720). Ills. 2500 w. A A Wkly—April 2, 1917. Serial, 1st part. Details of equipment and proceedings.

The German Aeroplane Engine Trials (80306). Ills. 3000 w. A A Wkly—Aug. 6, 1917. Lessons learned from trials.

**Flying**

Formation Flying (80608). F. W. Lanchester. Ills. 2500 w. A A Wkly—Aug. 20, 1917. Serial, 1st part. Its objects, advantages and difficulties.

Formation Flying as Taught by Nature (81027). F. W. Lanchester. Ills. 4000 w. A A Wkly—Sept. 10, 1917. Study formation flying as practiced by birds.

Risky Flying Weather (81025). W. G. Duffield. Ills. 2000 w. A A Wkly—Sept. 10, 1917. Discusses good and bad flying weather.

**Flying Boats**

Floats and Hulls For Flying Boats (81302). Dwight S. Simpson. Ills. 2500 w. A A Wkly—Sept. 24, 1917. Types in present use.

**Framework**

Methods Used in Finding Fuselage Stresses (80078). J. A. Roché. Ills. 1000 w. A A Wkly—July 23, 1917. Reasoning leading to choice of criterion and methods.

**Hydroaeroplane**

The Curtiss Hydroaeroplane Patent (74710). Glenn H. Curtiss. Ills. 6500 w. A A Wkly—Nov. 20, 1916. Specifications of important patents.

**Hydrogen**

Modern Processes for the Technical Production of Hydrogen for Dirigible Airships and Balloons (74389). Harry L. Barnitz. Ills. 2500 w. A A Wkly—Nov. 6, 1916. Serial, 1st part. Data gained by 16 years of experience in research work.

Hydrogen for Military Purposes (79783). Ills. 2500 w. A A Wkly—July 9, 1917. Serial, 1st part. Notes prepared by C. De F. Chandler, Signal Corps, for army balloon school, Fort Omaha.

**Ignition**

Ignition Units on Aviation Engines (80357 B). Roger E. G. Chauveau. Ills. 3000 w. S A E, Jl—July, 1917. Troubles experienced, with outline constructions that will produce the best conditions.

**Italy**

Aeronautical Developments in Italy (80205). Ills. 800 w. A A Wkly—July 30, 1917. Progress since 1915.

**Kite Balloons**

Construction and Operation of Kite Balloons (75345). Ralph H. Upson. Ills. 1000 w. A A Wkly—Dec. 18, 1916. Serial, 1st part. Concerning their operation and value.

Kite Balloons—The Eyes of the Artillery (75074 A). Ills. 1800 w. Flying—Dec., 1916. Serial, 1st part. Developments of the war captive balloon.

Construction and Operation of Kite Balloons (76714). Ralplh H. Upson. Ills. 1200 w. A A Wkly—Feb. 12, 1917. Serial, 1st part. Information concerning their operation and value.

**Lafayette Corps**

The Lafayette Flying Corps (79841 A). Ills. 3000 w. Flying—July, 1917. The organization, tests, financing, etc.

**Liberty Motors**

The Value of the Liberty Motors (81300). 1600 w. A A Wkly—Sept. 24, 1917. Official report.

The Liberty Motor (81692 A). 2000 w. Flying—Oct., 1917. Information concerning this design.

**Magnetos**

Aeroplane Magnetos (78876). 1200 w. Times Eng Supp—Apr. 27, 1917. Abstract of paper by A. P. Young before Aeronautical Society.

The High-Tension Magneto With Special Reference to the Ignition of Aeroplane Engines (81303). A. P. Young. Ills. 1800 w. A A Wkly—Sept. 24, 1917. Serial, 1st part. History of electrical ignition, fundamental considerations, analysis of the working, etc.

**Manufacture**

Minor Difficulties in Aircraft Manufacture (77418 A). 1500 w. Engng—March 2, 1917. Editorial review of G. S. Walpole's lecture before the Aeronautical Society.

**Meteorology**

Physics of the Air (80564 B). W. J. Humphreys. Ills. 40 pp. Fkn Inst, Jl—Aug., 1917. Serial, 1st part. Assemblage of facts and theories, with explanations.

**Military Aeronautics**

Battleplanes and Aircraft Guns—The Dominant Factors in Maintaining the Supremacy of the Air (79840 A). Henry Woodhouse. Ills. 6500 w. Flying—July, 1917. Excerpts from forthcoming book. Types of service aeroplanes in use.

Military Aeronautics (79716 A). William Mitchell. Ills. 5000 w. E Cb Phila—July, 1917. Organization in the United States for the development of air service.

**Naval Aeronautics**

Naval Anti-Aircraft Defenses (77794 A). Henry Woodhouse. Ills. 3000 w. Flying—April, 1917. Flying, floating, and shore defenses, with related information.

**Pilots**

The Motorist's Hands (80118 A). Charles L. Freeston. 2500 w. Autocar—July 7, 1917. Who make the best aeroplane pilots?

**Propellers**

Aeronautical Propellers (81154 F). Spencer Heath. 2000 w. Am Soc Nav Engrs, Jl—Aug., 1917. Explains principles; differences between air and marine screws, etc.

Aeronautical Propellers (81305). Spencer Heath. 2500 w. A A Wkly—Sept. 24, 1917. The making of air screws, the difference between air and marine screws, etc.

A New Method of Testing Propellers (81304). Gustave Eiffel. 2000 w. A A Wkly—Sept. 24, 1917. Tables and explanation of method.

The Screw Propeller in Air (81026). M. A. S. Riach. Read before Aeronautical Soc. of Gt. Britain. Ills. 2500w. A A Wkly—Sept. 10, 1917. Serial, 1st part. The blade element theory is discussed.

**Radiators**

Airplane Radiator Construction (81324). P. M. Heldt. Ills. 1500 w. Auto—Sept. 20, 1917. Radiating surface required for engines of different horsepower.

**Seaplane**

Burgess Type "U" Seaplane (74539). Ills. 800 w. A A Wkly—Nov. 13, 1916. Details and performance.

Verville Type Pusher Seaplane (76882). Ills. 1000 w. A A Wkly—Feb. 26, 1917. Descriptive.

The Gallaudet Navy Seaplane (78610). Ills. 600 w. A A Wkly—May 14, 1917. Dimensions and particulars.

The Burgess Speed Scout Seaplane (80609). Ills. 800 w. A A Wkly—Aug. 20, 1917. Details of this machine.

**Spinning**

Spinning (76494). George H. Bettinson. 1500 w. A A Wkly—Feb. 5, 1917. Instructions for inexperienced aviators.

**Standardization**

Standardization of Metal Parts for Aeronautic Use (76581 B). F. G. Diffin. 2000 w. S A E Bul—Jan., 1917. Advantages and recommendations.

Report of Aeronautic Division (80356 B). Ills. 5000 w. S A E, Jl—July, 1917. Report and discussion.

Steels Used in Aero Work (78874). 2400 w. Times Eng Supp—Apr. 27, 1917. Varieties and treatment best adapted for this purpose. Abstract of papers by Dr. W. H. Hatfield. R. K. Bagnall-Wild and E. W. Birch.

Steels Used in Aero Work (79652). W. H. Hatfield. 3500 w. A A Wkly—July 2, 1917. Serial, 1st part. Duties of the various parts, factors of strength, testing, etc.

The Use and Abuse of Steel For Aircraft (80415 A). R. K. Bagnall-Wild and E. W. Birch. Ills. 3000 w. Iron Age—Aug. 9, 1917. Troubles in obtaining proper material. Lack of heat-treating skill.

**Terms**

Terms Used in Aëronautics (79952). Ills. 4000 w. Am Mach—July 19, 1917. List of terms and their definitions.

**Tests**

Suggestions for Standard Tests of Aeroplanes (76712). 1000 w. A A Wkly—Feb. 12, 1917. Read before S. A. E. Outlines plan.

**Torpedoplane**

The Torpedoplane—Its Great Possibilities (77197 A). Bradley A. Fiske. Ills. 1600 w. Flying—March, 1917. Explains operation.

The Torpedoplane—An American Invention—Successfully used by Germans Against British Shipping (79172). 2000 w. A A Wkly—June 11, 1917.

**Training Aviators**

Training Aviators for the British Army (80831). Fred H. Colvin. Ills. 3000 w. Am Mach—Aug. 30, 1917. Details of intensive training.

**Training Tractor**

The Wittemann-Lewis Training Tractor (79923). Ills. 800 w. A A Wkly—July 16, 1917. Specifications, dimensions, areas, weights and performances of model TT.

**Wing-Trussing**

The Evolution of Aeroplane Wing-Trussing (76713). F. W. Pawlowski. Read before S. A. E. Ills. 3000 w. A A Wkly—Feb. 12, 1917. Traces development and describes types.

**Wires and Cables**

Nouvelle Méthode Pour Le Réglage de la Tension des Haubans (80716 B). C. M. Lécrici. Ills. 1300 w. Gen Civ—July 21, 1917. An acoustic method of adjusting wires and struts of an airplane by comparing their notes with that of rods of standard pitch.

## AUTOMOBILES

**Alcohol Fuel**

Australia and Alcohol Fuel (81827 A). 2000 w. Autocar—Sept. 29, 1917. First report of the Special Committee of the Commonwealth Advisory Council of Science and Industry.

**Aluminum Motors**

Special Cams Designed For Aluminum Engine of Premier (77845). A. L. Nelson. Ills. 1700 w. Auto—April 5, 1917. Read before Indiana Soc of S A E. Expansion of aluminum cylinders offset by altering cam profile.

**Ambulance**

Army Ambulance Service Highly Organized (77528). W. F. Bradley. Ills. 3500 w. Auto—March 22, 1917. Use of and experience with automobiles in hospital service.

French Develop Ideal Type of Light, Economical and Comfortable Army Ambulance (79706 A). W. F. Bradley. Ills. 2500 w. Com Vhle—July 1, 1917. Motor ambulance that has proven very satisfactory in the French army.

New U. S. Army Ambulance Corps Now in Training is Entirely motorized (81164 A). Joseph Husson. Ills. 2000 w. Com Vhle—Sept. 15, 1917. Equipment of novel Allentown camp.

French Ambulance System at Front (81606). W. F. Bradley. Ills. 2500 w. Auto—Oct. 4, 1917. Designs; clean machines; must carry gasoline for 24 hours' running.

**Armored Cars**

L'Evolution Des Automobiles Blindées (75592 B). Ills. 2700 w. La Nat—Nov. 18, 1916. Development of armored cars for the different warring nations.

**Automobile Organization**

The Cama—World's Greatest Automobile Organization (79615). W. F. Bradley. Ills. 3000 w. Auto—June 28, 1917. Operation of the automobile supply department of the French army.

**Automobile Preparedness**

Automobile Preparedness in Germany and U. S. (81085). E. A. Langdon. 2500 w. Auto—Sept. 13, 1917. A comparison of organization, resources, etc.

**Automobile Registration**

Automobile Registrations, Licenses, and Revenues in the United States, 1916 (79816). 15 pp. U S Dept Ag, Circ 73—June 21, 1917.

**Axles**

Timken Axles (77181). Ills. 1800 w. Auto—March 8, 1917. Floating and semi-floating rear axle designs and two front axle types.

American Ball Bearing Co. Axles (77985). Ills. 1000 w. Auto—April 12, 1917. Types of closed-housing and inserted unit housing.

**Bakelite**

Fabricated Bakelite Materials (81478). Ray P. Jackson. Ills. 2000 w. Auto—Sept. 27, 1917. Read before Cleveland Soc. of S. A. E. Bonding materials.

**Batteries**

Charging Single Starting and Lighting Batteries With a Mercury Arc Rectifier (75469). A. L. Atherton. Ills. 1200 w. Elec Jl—May, 1917. Details of the outfit and its use.

**Battery Charging**

Electric Commercial Vehicle (74728 N). Ills. 1500 w. Comwh Engr—Oct. 2, 1916. Battery charging station in Sydney, Australia.

**Bodies**

Body Comfort Improved (75910). A. Ludlow Clayden. Ills. 5500 w. Auto—Jan. 11, 1917. Improvements in details as shown in exhibits at automobile shows.

Motor Body Nomenclature (75640 A). Ills. 500 w. Autocar—Dec. 16, 1916. Comparison of types and names in America and England.

**Brake Linkage**

Brake Linkage Design Analyzed (77984). J. Edward Schipper. Ills. 2500 w. Auto—April 12, 1917. The equalizer, question and commercial applications.

**Brakes**

Compresseur-Frein Pour Le Réglage De La Vitesse (75601 B). L. Pierre-Guédon. Illus. 1900 w. Gen Civ—Dec. 9, 1916. Air brake for automobiles or locomotives compressing air by motion of vehicle mechanism.

Vacuum Brake for Automobiles (74357). Ills. 1200 w. Auto—Nov. 2, 1916. System used for train brakes applied to any car.

**Brick Foundry**

See Foundries, under ***Machine Works and Foundries.***

**British Industry**

The Future of the British Motor Industry (78981 A). 1700 w. Autocar—May 12, 1917. Serial, 1st part. Measures that should be taken to strengthen it.

**Cams**

Cam Design (77433 A). Georges Funck. Ills. 3500 w. Autocar—March 3, 1917. Objects and features of various contours.

**Carbureters**

Few Changes in Carbureter Design (75319). Ills. 5500 w. Auto—Dec. 14, 1916. Principles in use are greatly intensified.

Lower Fuel is Greatest Carbureter Problem (75318). J. Edward Shipper. Ills. 2200 w. Auto—Dec. 14, 1916. Improvements made.

The Ferguson Carburetter Control (75117 A). Ills. 2500 w. Autocar—Nov. 18, 1916. Simple means of obtaining 15% to 20% additional fuel economy with this device.

Low Velocity in Ensign Carbureter (76329 A). A. W. Ensign. Ills. 1500 w. Auto—Jan. 25, 1917. Details of instrument claiming to use gasoline distillate or kerosene with small modification.

New Ensign Kerosene Carbureter (80768). Ills. 1300 w. Auto—Aug. 23, 1917. No preheating of air and no jacketing.

The Holley Paraffin Carbureter (80622 A). Ills. 600 w. Autocar—Aug. 4, 1917. Particulars of the vaporizer adopted for use on the M. O. M. (Ford) farm tractors.

**Carburetion**

I. A Standard of Carbureter Performance. O. C. Berry. II. A Few Points on Carburetion. F. C. Mock. Two papers discussed together (77315 B). Ills. 25 pp. S A E, Bul—Feb., 1917.

**Car Conversions**

The Conversion of Ford Cars into Commercial Vehicles (80116 A). Ills. 1000 w. Engr—July 6, 1917. Comments on some of the makes.

**Car Jacks**

The Jack a Part of the Car (80543 A). Ills. 3000 w. Autocar—July 28, 1917. A device that lifts the car bodily so that the wheels can be changed.

**Car Lighting**

Car Lighting Regulations (81826 A). Ills. 900 w. Autocar—Sept. 29, 1917. English and Scottish lighting orders.

**Cartage**

The Scope of Electric and Petrol Road Vehicles in Railway Parcels cartage (77164A). 1800 w. Ry Gaz—Feb. 16, 1917. Advantages and limitations. Results in service.

**Car Testing**

Easy Ability Testing (76330 A). Charles E. Manierre. 4000 w. Auto—Jan. 26, 1917. Simple methods.

Much Learned in Standard Car Test (79616). David L. Gallup and A. Ludlow Clayden. Also Standard Form for Complete Car Performance Test. 4000 w. Auto—June 28, 1917. Curves made with S. A. E. standardized apparatus and what they indicate.

**Car Weight**

Weight Distribution in Passenger Cars (80861). P. M. Heldt. 2000 w. Auto—Aug. 30, 1917. Analysis of the proportion of total road weight of a car constituted by each of its major parts.

**Clutch Facing**

Complete Cork Clutch Facing Possible (76852). History of Cork—From Tree to *User*. Ills. H. W. Prentice, Jr. 2000 w. Auto—Feb. 22, 1917.

**Coal Gas**

Coal-Gas for Motor Vehicles (80041). 2000 w. Times Eng Supp—June 29, 1917. Results of attempts to use it instead of gasoline. Problems in connection with its use.

Coal Gas as a Motive Power (79721 A). 2000 w. Autocar—June 16, 1917. Reviews prospects of its use for private car work.

Coal Gas For Motor Vehicles (81417). 1000 w. Times Eng Supp—Aug. 31, 1917. Precautions and modifications of equipment that facilitate the use of coal gas.

Coal Gas as Automobile Fuel (82065). 1500 w. Auto—Oct. 25, 1917. Methods of storing on the vehicle. Effect of high compression, etc.

Coal Gas for Motor Vehicles (81858 A). Ills. 2000 w. Engr—Sept. 14, 1917. Discusses the advantages and disadvantages.

Compressed Coal Gas for Motor Lorries (81705 A). 1000 w. Surv'r—Sept. 7, 1917. Report of successful Glasgow experiments.

The Lyon Spencer Gas Installation (81704 A). Ills. 1000 w. Autocar—Sept. 22, 1917. Particulars of the construction of the gas container and details of the additional engine fittings.

Through London on Coal Gas (81954 A). Ills. 1000 w. Autocar—Oct. 6, 1917. Demonstration of the trailer method of carrying the container.

**Control**

Control Layout Design Analyzed (81084). J. Edward Schipper. Ills. 2200 w. Auto—Sept. 13, 1917. Tendencies to improve accessibility and comfort in driving automobiles.

**Couplings**

Flexible Universals Gaining Favor (81766). C. A. Schell. Ills. 2500 w. Auto—Oct. 11, 1917. Experiments and practical use. Reliable when properly designed.

**Crankshaft Problems**

Crankshaft Problems in Automobile Engines (76580 B). A. P. Brush, with discussion. 20 pp. S A E Bul—Jan., 1917. On crank shaft counterbalancing.

**Cultivator**

A New Mechanical Cultivator (80426 A). Charles L. Freeston. Ills. 1200 w. Autocar—July 21, 1917. Plows and pulverizes the soil in one operation.

**Design**

Then and Now (74731 A). F. W. Lanchester. Ills. 2000 w. Autocar—Nov. 4, 1916. The difficulties of the pioneer designers.

Piston and Connecting Rod Design (74976 A). Ills. 1200 w. Autocar—

Nov. 11, 1916. Scheme to eliminate the gudgeon pin and to secure other advantages.

Some Whole Truths Regarding the Constant Pressure Cycle (75272 A). Arthur B. Browne and Herbert Chase. 1800 w. E Cb Phila—Dec., 1916. Reply to criticism by James Langmuir Napier.

Many Factors in Brake Design (75013). John Younger. Read before the Penn section of S. A. E. 3000 w. Auto—Nov. 30, 1916. Tire adhesion, road and wind resistance, etc.

The Trend of American Design (77643 A). A. Ludlow Clayden. Ills. 2800 w. Autocar—March 10, 1917. Comments on features of 1917 practice.

War Reveals Defects in Design (78460). W. F. Bradley. Ills. 5000 w. Auto—May 3, 1917. Serial, 1st part. Outlines defects in design of cars brought out by war use.

Military Influence on Motor Truck Design (79347 B). H. D. Church, with discussion. 30 pp. Cleve Eng Soc, Jl—May, 1917. Important points in the design of military trucks.

**Dynamic Balancing**

Dynamic Balancing of Rotating Parts (76035 B). F. Hymans. Ills. 24 pp. S A E, Bul—Dec., 1916. The necessity of obtaining running balance, giving details of two machines used.

**Dynamics**

Remarks on Dynamics of the Automobile (76036 B). N. W. Akimoff. Ills. 8 pp. S A E Bul—Dec., 1916. Problems of easy riding.

**Electrical Equipment**

Electrical Equipment of a Car, with Special Reference to American Starting and Lighting Systems (74771 N). A. Ludlow Clayden. Ills. 29 pp. Inst Aut Engrs—Nov., 1916. Systems in most general use.

**Electric Systems**

Electric Systems Simpler (75012). A. Ludlow Clayden. Ills. 4500 w. Auto—Nov. 30, 1916. Progress in past year.

**Electric Trucks**

Electric Truck Troubles and Means Taken to Eliminate Them (74360 A). F. E. Whitney. 3000 w. Com Vhle—Nov. 1, 1916. General development and improvement in details.

Electric Vehicle Trial at Manchester (74482 A). S. L. Pearce. 2500 w. Surv'r—Oct. 20, 1916. Report of trial of electric lorry for carting work.

Electric Trucks—A Remedy for Terminal Freight Congestion (78017). Ills. 3000 w. Elec Wld—April 14, 1917. Applications at Bush Terminal, Brooklyn, N. Y.

Battery Exchange Service at Hartford (78367). Ills. 3500 w. Elec Wld—April 28, 1917. Total of 88 electric trucks in operation every day.

Economics Effected by Electric Refuse Trucks (78846 N). A. Jackson Marshall. 400 w. Nat Elec Lgt Assn—May, 1917. Results achieved in Dover, England.

Timely Economy of Industrial Electric Trucks 79361). Ils. 2500 w. Elec Wld—June 23, 1917. Extraordinary development in last two years.

**Electric Vehicles**

Electromobile Experience (76543 A). R. Borlase Matthews. 2500 w. Elec Rev—Jan. 19, 1917. Experience with electric vehicles in a large English garage.

Self-Propelled Electric Vehicles and Their Applications (76897 N). L. Brockman, with discussion. Ills. 52 pp. Instn E & S Scot—Jan., 1917. Their construction, equipment, reliability, limitation, etc.

Memphis 600000 Kw.-Hr. Vehicle Load (77545). O. H. Caldwell. Ills. 2000 w. Elec Wld—March 24, 1917. Confidence in the electric automobile.

Electric Vehicles (78658 A). C. G. Conradi. Abstract of paper before the Derby Soc. of Engrs. 2500 w. Elec'n—Apr. 27, 1917. Features, advantages and disadvantages.

Electric Vehicles and Their Use on Cleansing Work in Sheffield (80381 A). J. A. Priestley. Ills. 2500 w. Surv'r—July 13, 1917. Costs and work in refuse collection.

Electric Vehicles in Municipal Service (80378 A). S. L. Pearce. 1500 w. Surv'r—July 6, 1917. Reports a year's work of a one-ton "Edison" lorry.

Motors in Agriculture (80427 A). Ills. 2200 w. Autocar—July 21, 1917. Reasons favoring their adoption.

Improving Electric-Vehicle Performance During Winter (82072). Kennedy Rutherford. 3000 w. Elec Rev & W Elec—Oct. 27, 1917. Use of anti-skid devices; overcoming reduction of battery capacity, etc.

**Endless-Track Vehicles**

Vehicles with Self-Laying Tracks (76378 A). Ills. 1400 w. Mech Wld—Jan. 19, 1917. Serial, 1st part. This principle of propulsion and its application.

**Engine Cooling**

Automobile Engine Cooling (80358 B). A. K. Schanze. Charts. 7500 w. S A E, Jl—July, 1917. Deals only with water-cooled engines; gives particular attention to the fan.

**Engine Cycles**

Automobile-Engine Cycles of the Future (75160 B). Herbert Chase, with discussion. Ills. 7500 w. S A E, Bul—

Nov., 1916. Study of present-day engines and means of overcoming their deficiencies; proposed constant pressure engine.

**Engines**

Engines for 1917 a Culmination of Refinement (74525). J. Edward Schipper. Ills. 1600 w. Auto—Nov. 9, 1916. Serial, 1st part. General trend.

Truck and Tractor Engines (74352 B). H. L. Horning. 18 pp. S A E, Bul—Oct., 1916. Requirements; problems; probable lines of future development.

Four is Ultimate Engine (75316). A. P. Brush. 1500 w. Auto—Dec. 14, 1916. Four is automobile engine of greatest value.

Four-Cylinder Best Tractor Engine (75163). A. A. Potter and W. A. Buck. 2000 w. Auto—Dec. 7, 1916. Tests show great variations in performance.

Some Essential Features of High Speed Engines (75156 B). A. F. Milbrath. 2500 w. S A E, Bul—Nov., 1916. Possibilities of higher engine speeds and mean effective pressures.

Continental Engines (77368). Ills. 2500 w. Auto—March 15, 1917. Six models. Three fours and three sixes.

Heavy-duty Hercules Engines for Motor Trucks (77427 A). Ills. 1500 w. Com Vehle—March 15, 1917. Full pressure oiling, five-bearing crankshafts, individual separate heads, and unusual supporting means used.

Detachable Heads for National Twelve (78461). Ills. 1400 w. Auto—May 3, 1917. Improvements that give greatly increased power.

Three Herschell-Spillman Engines (78588). Ills. 1000 w. Auto—May 10 1917. Eight, six, and four cylinder models designed to cover requirements of all manufacturers of assembled cars.

Williams Engine is Two-Cycle Design (78354). Ills. 1200 w. Auto—Apr. 26, 1917. New construction for automobile, truck, aero, and marine use.

Heavy Oil Engine Facts and Fallacies (79614). Reginald W. Crawly. Ills. 4000 w. Auto—June 28, 1917. Problem not solved.

Overhead Valve Problem of an Aluminum Engine (79833 B). A. L. Nelson, with discussion. Ills. 3000 w. S A E Bul—June, 1917. Aims to show how the disadvantages of the valve mechanism can be eliminated by a simple change of the conventional cam.

Suction Turbulance (79720 A). 2200 w. Autocar—June 16, 1917. Explanation, showing it to be a vital factor in the working of petrol engines.

Construction of Junkers Engine (80840 B). Philip L. Scott, with discussion. Ills. 5500 w. S A E, Jl—Aug., 1917. Personal experience and results of tests.

Two-Stroke Cycle Engine Analysis (81607). E. H. Sherbondy. Ills. 3500 w. Auto—Oct. 4, 1917. Serial, 1st part. Advantages and drawbacks. Why the two stroke has made slow progress.

**Engine Supports**

Engine-Supporting Methods (81896). P. M. Heldt. Ills. 2500 w. Auto—Oct. 18, 1917. Details of supporting systems.

**Engine Tests**

Suggests a New Testing Method (75462). Daniel Roesch. 1200 w. Auto Dec. 21, 1916. Outlines novel way of plotting engine characteristics.

Tests of a Modern Touring-Car Engine (75452 A). G. L. Guillet. 2500 w. Mech Engr—Dec. 8, 1916. Results of efficiency tests made at Queen's University, Ontario.

Testing Variable-Speed Engines by a New Method (76577 B). Daniel Roesch. 1500 w. S A E Bul—Jan., 1917. Investigations. Graphical presentation of data.

**Farm Machinery**

Burford-Cleveland Tractor and "Once-Over" Tiller (80401 A). Ills. 1200 w. Engng—July 20, 1917. Construction and trial of American farming machinery.

**Ford**

The Mechanical Features of the Ford. Are They Unique and Worthy of Adoption by British Motor Manufacturers? (78035 A). Ills. 4000 w. Autocar—March 24, 1917. The Appreciation. J. T. Ward. The Reply. M. Walter. Interesting comment.

**Ford Truck**

Ford Truck Now Ready—Price $600 (80308 A). J. Edward Schipper. Ills. 1000 w. Com Vhle—Aug. 1, 1917. Details of design.

**France**

The French Motor Industry After the War (76737 A). H. O. Duncan. 1800 w. Autocar—Jan. 27, 1917. Protection needed; changes, etc.

**Franklin Engine**

The Franklin Air-Coooled Motor Engine (76842 A). Plate & Ills. 600 w. Engng—Feb. 2, 1917. Interesting features.

**French Transport**

French Transport Service Highly Organized (81327). W. F. Bradley. 3500 w. Auto—Sept. 20, 1917. Serial, 1st part. Care taken to keep trucks always busy.

**Fuels**

Alcohol—The Fuel of the Future (75014). Bernard N. Glick. Ills. 2500 w. Auto—Nov. 30, 1916. Supply from utilization of wood waste.

Motor Spirit and its Quality (75218 A). Albert Lidgett. 2000 w. Autocar—Nov. 25, 1916. Possibilities of a universal standard.

The Fuel Question—From the Driver's Viewpoint (79834 B). F. C. Mock, with discussion. 8000 w. S A E Bul—June, 1917. Fuel conditions; essential properties of automobile fuel, etc.

**Gasoline Substitutes**

A "Substitute for Gasoline" (74430 A). Robert D. Kinney. Ills. 1200 w. Am Soc Mar Dn—Oct., 1916. Method of deceiving.

**Gears**

Variable-Speed Gears for Motor Road Vehicles (75897 A). Robert E. Phillips. Read before Inst. of Mech. Engrs. Ills. 2500 w. Engng—Dec. 22, 1916. Serial, 1st part. Outlines improvements made in these mechanisms and their bearing on the development of road locomotion.

**German Design**

War Changes German Design (80448). E. A. Langdon. 2800 w. Auto—Aug. 9, 1917. Serial, 1st part. Changes in cars and trucks in military service.

**Germany**

War Develops German Industry (74526). E. A. Langdon. 2500 w. Auto—Nov. 9, 1916. Changes due to lack of rubber and metals.

**Glare**

Head-Lamp Glare—What Is It? (76579 B). J. B. Replogle, with discussion. 8000 w. S A E Bul—Jan., 1917. Effect of light on the human eye; glare and its elimination; reflectors, etc.

**Headlamps**

A Survey of the Automobile Headlamp Situation (78811 C). W. F. Little, with discussion. Ills. 35 pp. Ill Eng Soc, Trans—Apr. 30, 1917. Theoretical principles of the automobile headlamp.

Head-Lamp Design and Its Effect Upon Glare Reduction (78712 B). Alden L. McMurtry, with discussion. Ills. 33 pp. S A E Bul—April, 1917. Reviews the design and operation of the electric headlamp; principles of glare reduction.

Present Practice in Automobile Headlighting (78812 C). Stephen Carleton Rogers, with discussion and bibliography. 13 pp. Ill Eng Soc, Trans—April 30, 1917. Importance of proper headlighting; state regulations, glare, etc.

Road Illumination by Means of Automobile Headlights (79380 C). H. P. Gage. Ills. 8 pp. Ill Eng Soc, Trans—June 11, 1917. Distribution and intensity of light from automobile headlamps.

Road Illumination by Means of Automobile Headlamps (80892 A). H. P. Gage. Ills. 3000 w. Gen Elec Rev—Sept., 1917. Distribution and intensity of light. Overcoming glare.

**Headlights**

The Determination of Headlight Glare (74804). O. B. Replogle. 3000 w. Auto—Nov. 23, 1916. Glare defined. Rules in various cities.

Attack Headlight Glare Problem (76101). 2500 w. Auto—Jan. 18, 1917. On present unsatisfactory condition. Symposium.

A Survey of the Automobile Headlight Situation (77143 A). W. F. Little. 4500 w. Gen Elec Rev—March, 1917. Elimination of glare.

Glare Problem Analyzed (77529). Alden McMurtry. Ills. 2500 w. Auto—March 22, 1917. Serial. 1st part. Explanation of factors involved.

The Automobile Headlighting Problem (81510). Evan J. Edwards. Ills. 1800 w. Elec Rev & Wes Elec—Sept. 29, 1917. States present conditions and recommends system which could overcome deficiencies.

**Heat-Balance Tests**

Heat-Balance Tests of Automobile Engines (76037 B). Walter T. Fishleigh and W. E. Lay. 16 pp. S A E, Bul—Dec., 1916. Describes a comprehensive test, analyzing results.

**Horsepower**

Horsepower Facts and Fallacies (78353). Ludlow Clayden. 3000 w. Auto—April 26, 1917. Limits of power and weight—Correct power curves, etc. Elementary principles.

**Hupmobile**

See Shop Practice, under *Machine Works and Foundries.*

**Ignition**

Spark Ignition (74574 A). J. D. Morgan. 2000 w. Engng—Nov. 3, 1916. Investigation of the effect of spark intensity on ignition in internal combustion engines.

Ignition Is Much Improved (75161). Ills. 5500 w. Auto—Dec. 7, 1916. Development during past year.

Spark Type Affects Power (75162). J. D. Morgan. 2000 w. Auto—Dec. 7, 1916. Tests show that character of mixture affects quality of spark.

Some Operating Features of Automobile Ignition (78472). Horace Van S. Taylor. Ills. 1500 w. Elec Jl—May, 1917. Reasons for certain features of operation.

Problems in Ignition Development (79717 A). H. E. Rice. Ills. 3000 w. E Cb, Phila—July, 1917. Problems involved in ignition equipment, those already solved and work yet to be done.

The Evolution of Ignition (80795 A).

H. O. Duncan. Ills. 1600 w. Autocar—Aug. 11, 1917. Tube, accumulator and magneto ignition reminiscences.

Problems in Ignition Development (80842 B). H. E. Rice. Ills. 4000 w. S A E, Jl—Aug., 1917. Early history; general types of battery systems.

**Kerosene**

Kerosene Needs Special Engine (80769). W. G. Clarke. Read at Fremont S. A. E. tractor meeting. 3500 w. Auto—Aug. 23, 1917. Good results from engine and vaporizer designed for each other.

Fundamentals of a Successful Kerosene-Burning Tractor Engine (80354 B). C. E. Sargent. 2000 w. S A E, Jl—July, 1917. Limitations of its present engines; and difficulties in burning kerosene; improved design.

**Laboratory**

Some Phases of Testing Laboratory of a Large Auto Concern (79130 A). Fritz G. Marstellar. Ills. 2500 w. Mich Tech—May, 1917. Materials tested and work carried, testing machines, etc.

**Legislation**

Legislation Proposed for Motor Trucks (75210). George D. Steele. 8500 w. Br Rds & Sts—Dec., 1916. Serial, 1st part. Data from several states on truck legislation.

**Lorry**

Five-ton Petrol Motor Lorry (78581 A). Ills. 500 w. Engr—April 20, 1917. Details of English built vehicle designed for hard usage.

**Lubrication**

Pressure Lubrication Advantages (75317). A. Ludlow Clayden. Ills. 3300 w. Auto—Dec. 14, 1916. High pressure oil feeding. Importance of cooling effect of oil on bearings.

Chassis Lubrication (77369). Roland Chilton. 2500 w. Auto—March 15, 1917. Lubrication of working parts not included in the power plant and transmission.

Valve Stem Lubricators (77435 A). Ills. 1500 w. Autocar—March 3, 1917. Invention to maintain the smooth and quiet working of poppet valves.

Chassis Lubrication (78714 B). Roland Chilton, with discussion. Ills. 17 pp. S A E Bul—April, 1917. Problems and their solution.

The Hot Spot on the Piston (80378 A). Ills. 3000 w. Autocar—July 14, 1917. One of the chief causes of dirty engine oil and bearing wear.

**Magnetos**

A Paper on the Magneto (77434 A). Ills. 2000 w. Autocar—March 3, 1917. Reviews a paper by E. A. Watson.

**Military Trucks**

Church Defines Military Truck (78159). H. D. Church. Read before Cleveland Engrg Soc. 3500 w. Auto—April 19, 1917. Designs to meet American conditions.

Military Truck Specifications Issued (78156). A. Ludlow Clayden. 2000 w. Auto—May 19, 1917. Twelve main essentials.

Standard Specifications for 1½-Ton and 3-Ton Gasoline Motor Trucks, April, 1917 (78160). 25000 w. Auto—April 19, 1917. Prepared by Motor Transport Board of War Department.

Successful Army Trucks (78157). W. F. Bradley. Ills. 3000 w. Auto—April 19, 1917. Serial, 1st part. Mechanical features of trucks and cars in Italian army service, with comments.

Italy's War Truck Experience a Lesson for American Army (78499 A). W. F. Bradley. Ills. 2500 w. Com Vhle—May, 1917. Details and defects brought out in service.

Military Influence on Motor-Truck Design (78715 B). H. D. Church. 2500 w. S A E Bul—April, 1917. Mainly a consideration of the two-wheel driven trucks of 1½ tons capacity.

Ordnance Department Truck Specifications (80176). 3500 w. Auto—July 26, 1917. Instructions to bidders on 3-ton and 2-ton gasoline motor trucks with 4-wheel drive.

War Department Takes Over Military Truck Design (80174). A. Ludlow Clayden. 1200 w. Auto—July 26, 1917. Only standardized trucks to be bought.

War's Success Demands Standardized Trucks (80175). W. M. Britton. 4000 w. Auto—July 26, 1917. Discusses action needed.

Lessons of the War in Truck Design (79705 A). W. Owen Thomas. 2500 w. Com Vhle—July 1, 1917. Serial, 1st part. A study of the maintenance problem, and important items of design.

Features of War-Truck Design (79620). Owen Thomas. 2500 w. Auto—June 28, 1917. Serial, 1st part. Details that should be improved.

France Saved by Trucks (79990). W. F. Bradley. Ills. 3500 w. Auto—July 19, 1917. Value of service at Verdun.

First Class B Military Trucks on the Road (81765). A. Ludlow Clayden. Ills. 1800 w. Auto—Oct. 11, 1917. Two vehicles, built of standardized, composite parts, started on 10,000 mile road test.

The Building of the United States Military Truck (81524 B). 4800 w. S A E, Jl—Sept., 1917. Details of engine design, construction, equipment and plans for production.

Troop Movement by Motor Truck (81897). W. F. Bradley. Ills. 2500 w. Auto—Oct. 18, 1917. 30,000 men moved in ten hours.

**Mobile Armament**

Mobile Armament for Defense (80334 A). Andrew M. Coyle. Ills. 5500 w. A S M E, Jl—Aug., 1917. Confined to discussion of armed and armored automobiles and railway cars and heavy mobile guns.

**Motor Cars**

The Development of the Motor Movement (74730 A). Lord Montagu. Ills. 2200 w. Autocar—Nov. 4, 1916. How the motor car act of 1903 was passed.

Eighteen Years of Motor Car Making (77926 A). Edward Genna. Ills. 2500 w. Autocar—March 31, 1917. The early cars of the Sunbeam Co.

**Motorcycles**

Motorcycle Men Develop Army Standards (80447). P. M. Heldt. Ills. 2500 w. Auto—Aug. 9, 1917. Recommendations for control and operation of military motorcycles.

**Motor Fuels**

Acetylene Gas as a Motor Fuel (78819 A). 3000 w. Autocar—May 5, 1917. The difficulties to be overcome. Comparative costs of running on acetylene, petrol, and paraffin.

Gas-Driven Motor Vehicles (81094 A). Ills. 3000 w. Engr—Aug. 31, 1917. Information concerning the use of gas instead of petrol, the necessary adjustments, storage problems, etc.

**Motoring**

Twenty Years of Motoring (75217 A). Charles L. Freeston. Ills. 2000 w. Autocar—Nov. 25, 1916. Serial, 1st part. Experiences and impressions.

**Motor Spirit**

The Problem of Motor Spirit (74555 A). Albert Lidgett. Ills. 2500 w. Autocar—Oct. 28, 1916. Study showing supplies are ample.

**Motor Trucks**

Equipping Motor Trucks for Central Station Service (74403). Ills. 2000 w. Elec Wld—Nov. 4, 1916. For lamp installation, maintenance, and trouble service.

Few Changes in Truck Design (74356). Ills.. 3000 w. Auto—Nov. 2, 1916. Recent improvements.

Great Production Prevents Radical Changes for 1917 (74359 A). Ills. 5500 w. Com Vhle—Nov. 1, 1916. Trend in design, capacity, prices, etc.

Ice Delivery by Motor Trucks (74944 A). 2500 w. Ice & Refrig—Nov., 1916. Replies to queries sent out showing advantages.

The Truck's Emancipation (74355). A. Ludlow Clayden. Ills. 5500 w. Auto—Nov. 2, 1916. Its evolution and problems.

Four-ton Canadian War Service Truck (75066 A). Ills. 2000 w. Com Vhle—Dec. 1, 1916. Simplicity, flexibility and ruggedness.

Factors Controlling Maximum Overall Dimensions of Motor Trucks (76076). A. F. Masury and George O. Hanshew. Paper before Am. Soc. for Adv. Sci. 2000 w. Eng & Con—Jan. 17, 1917. Existing physical and legal factors.

The Motor Truck and the Road (75776). Nelson P. Lewis. 2200 w. Eng Rec—Jan. 6, 1917. Indications are that 6-ton load carrying capacity will be the maximum.

What Motor Trucks Offer to Contractors (75777). Arthur J. Slade. Ills. 1800 w. Eng Rec—Jan. 6, 1917. Machines developed for variety of construction uses.

Motor Transportation in Telephony (78163). Rollin W. Hutchinson, Jr. Ills. 3000 w. Telephony—April 21, 1917. Serial, 1st part. Use of motor vehicles by telephone companies.

See also IMPROVING TRANSPORTATION, under INDUSTRIAL MANAGEMENT, *Management.*

**Motor Vehicles**

Commercial Motor Vehicles for Railway and Industrial Purposes (74988 A). G. Martin Gamble. (Abstract.) 4500 w. Ry Gaz—Nov. 10, 1916. Serial, 1st part. Road traction by steam, petrol, and electric vehicles.

Steam Motor-Vehicles (75159 B). Abner Doble. Ills. 2500 w. S A E, Bul—Nov., 1916. Summary of investigations covering nine years.

Motor Transportation in Telephony (80472). Rollin W. Hutchinson, Jr. Ills. 3500 w. Telephony—Aug. 11, 1917. Last of a series of articles on the use of motor vehicles by telephone companies.

**Mufflers**

Mufflers for Aeronautic Engines (78155). H. Diedrichs and G. B. Upton. From 2d report of Adv. Com. for Aeronautics. Ills. 3000 w. A A Wkly—April 23, 1917. Present development of muffling devices, with experiments.

**Packard**

1918 Packard in Two Chassis Lengths (80310). Ills. 2000 w. Auto—Aug. 2, 1917. Details introduced.

**Performance**

Methods of Comparing Automobile Performance (75157 B). Walter T. Fishleigh, with discussion. 8000 w. S A E, Bul—Nov., 1916. Factors and their determination.

Tractive Resistance Tests with an Electric Motor Truck (75471). 1500 w. Eng & Con—Dec. 20, 1916. Results of tests made by Mass. Inst. of Tech.

Trials of Performance Tests at Sheepshead Bay Speedway (75158 B). Ills. 1200 w. S A E, Bul—Nov., 1916. Acceleration, and fuel economy runs.

**Petrol**

Tests of Petrol Consumption (75621 A). Wilfred Gordon Aston. Ills. 2500 w. Autocar—Dec. 9, 1916. Serial, 1st part. Why the tests were made, methods of testing, and results.

The Petrol Restrictions (77157 A). 2500 w. Autocar—Feb. 17, 1917. Position of private motorists and full duty license holders in England.

**Petrol Storage**

The Bulk Storage of Petrol (74464 A). Ills. 2500 w. Autocar—Oct. 21, 1916. Advantages from the distributor's and user's points of view.

**Philippines**

Philippine Islands Are Fertile Field (76851). Percy Warner Tinan. Ills. & Maps. 2500 w. Auto—Feb. 22, 1917. Serial, 1st part. Details of roads and conditions, and sales possibilities.

**Pistons**

Stages in Alloy Piston Design (77182). Joseph Leopold. Ills. 1400 w. Auto—March 8, 1917. Eliminating faults in aluminum piston problem.

**Power Plant Design**

No New Trends in Power Plant Design (75792 A). 3500 w. Auto—Jan. 4, 1917. Improvements in workmanship. Large production.

**Progress**

Amalgamation of Detail Shows Progress (75909). Ills. 2000 w. Auto—Jan. 11, 1917. Improvements shown in exhibits at automobile show.

Analysis of the Year's Progress as Observed at Automobile Shows (78070 B). J. Edward Schipper, with discussion. 20 pp. S A E Bul—March, 1917. Improved features introduced.

**Racing Car**

The Aluminum Car (80544 A). Ills. 1500 w. Autocar—July 28, 1917. The Frontenac racing car in which cast iron is almost entirely eliminated and steel used only to carry weight and transmit power.

**Radiators**

Radiators for Motor Vehicles (76700 A). A. Houlson. 1100 w. Mech Wld—Jan. 26, 1917. Current practice.

**Recent Cars**

Engineering Progress Analyzed (76740). J. Edward Schipper. 4500 w. Auto—Feb. 15, 1917. Serial, 1st part. Read before S. A. E. Study of chassis and bodies.

**Repairs**

Mechanical Transport Repairs (80960 A). Ills. 2500 w. Autocar—Aug. 18, 1917. New machines made from old ones at the London M. T. Repair Depot.

**Retardation**

Retardation (75988 A). John Younger. Read before Penn. Soc. of S. A. E. 2500 w. E Cb. Phila—Jan., 1917. Car retardation is studied.

Retardation of the Automobile (76578 B). John Younger, with discussion. 5000 w. S A E Bul—Jan., 1917. Types and value.

**Russia**

Russian Motor Car Requirements (75634 A). 1200 w. Ry Gaz—Dec. 8, 1916. Openings for motor transport.

**Service Trucks**

The Motor Truck in Telephone Service (77223). C. L. Edholm. Ills. 2000 w. Telephony—March 10, 1917. Motor delivery efficiency in service of N. Y. Telephone Co.

**Spark Plugs**

Spark-Plugs for High-Speed Engines (81527 B). Albert Champion. 3500 w. S A E, Jl—Sept., 1917. The importance of spark-plugs and insulation.

**Speedometers**

Six Johns-Manville Speedometers (75463). Ills. 1200 w. Auto—Dec. 21, 1916. Five are new models.

**Springs**

Spring Suspension Problems (78158). N. W. Akinoff. 2500 w. Auto—April 19, 1917. Digest of paper read in Detroit before the S. A. E.

Automobile Springs (80851 A). Chester L. Lucas. Ills. 2000 w. Machy—Sept., 1917. Principal types, manufacture and testing.

**Standardization**

The Standardization Work of the S. A. E. (78068 B). George W. Dunham. 2000 w. S A E Bul—March, 1917. Shows advantages of the adoption of standards.

**Standards**

New Bearing and Valve Standards (79769). 800 w. Auto—July 5, 1917. Four series of S. A. E. inch-size ball thrust bearings and standard dimensions of poppet valves.

**Starters**

New Bijur Screw-Shift Starter Gear (80862). Ills. 800 w. Auto—Aug. 30, 1917. New design which, it is claimed, makes the locking of teeth an impossibility.

**Steam Cars**

The Steam Motor Car (77758 A). Abner Doble. 4000 w. A S M E, Jl—April, 1917. Early objections to steam motor cars, and how they were overcome. Recent developments.

Steam Car with Simple Systems (77033). Ills. 4000 w. Auto—March 1, 1917. Details of the Stanley steamer; almost fully automatic.

**Steering Gears**

Laying Out Steering Gears (80766). H. A. Stevens Howarth. Ills. 2000 w. Auto—Aug. 23, 1917. Simplified method for determining the angular errors and various proportions of the steering linkage.

**Storage Batteries**

Notes on Automotive Storage Battery Practice (80843 B). William H. Conant. 2000 w. S A E, Jl—Aug., 1917.

See Accumulators, under ELECTRICAL ENGINEERING, *Electro-Chemistry*.

**Suspension**

The Killden Suspension Systems (79568 A). Ills. 2500 w. Autocar—June 9, 1917. Attempt to design a spring which will be equally sensitive under all loads.

**Tires**

The Tire Industry (74803). 6500 w. Auto—Nov. 23, 1916. Increased production and changes introduced.

Power Losses in Pneumatic Tires (77316 B). E. H. Lockwood, with discussion. 11 pp. S A E, Bul—Feb., 1917. Results of tests.

**Torque-Weight Ratio**

Torque-Weight Ratio Shows Variation at Low Speeds (78587). J. Edward Schipper. 1200 w. Auto—May 10, 1917. Study of typical cars having different number of cylinders shows effect of weight and gear ratio.

**Tractive Force**

Draw-bar Pull (77160 A). Ills. 1400 w. Autocar—Feb. 17, 1917. Best standard for comparing haulage capacity of tractors and horses.

**Tractor Engines**

The Ultimate Tractor Engine (76103). H. L. Horning. 3500 w. Auto—Jan. 18, 1917. Factors that have influenced tractor development. Type and elements of design.

Altitude Effects on Tractor Engines (82064). 1000 w. Auto—Oct. 25, 1917. Simple device measures loss of power at any height during test at fixed altitude.

**Tractors**

Motors Trail Prospectors' Burros (76495). Willard L. Morrison. Ills. 3500 w. Com Vhle—Feb. 1, 1917. Motor transportation in mine haulage.

The Ultimate Type of Tractor Engine (76576 B). H. L. Horning. 3500 w. S A E Bul—Jan. 1, 1917. Analysis of factors that have influenced tractor development. Requirements of tractor engines. Design.

The Motor Tractor and Agricultural Development (77161 A). Ills. 3500 w. Autocar—Feb. 17, 1917. Review.

Tractor Farming (77158 A). A. Milligan. Ills. 2000 w. Autocar—Feb. 17, 1917. Why heavier crops can be ensured.

A Caterpillar Tractor (78213 A). Ills. and Plates. 3000 w. Engr—April 6, 1917. Mainly details of the Clayton and Shuttleworth caterpillar system.

An Analysis of the Tractor Situation (78069 B). Hugh McVey. Map. 3500 w. S A E Bul—March, 1917. Shows it to have become an economic necessity for a variety of work.

Ford Tractors at Work in England (77927 A). Rayner Roberts. Ills. 1000 w. Autocar—March 31, 1917. Report of two machines operating under the control of the Cheshire War Agricultural Committee.

British Transport Department Tractor (78717). Ills. 2500 w. Auto—May 17, 1917. Caterpillar machine of great power.

Farm Tractor Design (78716). 3000 w. Auto—May 17, 1917. Serial, 1st part. The kind of machine that should be built to meet farm conditions.

Machinery on the Farm (78867). 2000 w. Times Eng Supp—Apr. 27, 1917. Application and service tests of motor plows, tractors, etc.

La Culture Mécanique En France (78858 B). Ch. Dantin. Ills. 3100 w. Gen Civ—Apr. 14, 1917. Serial, 1st part. Use and development of gasoline tractors for agriculture in France. Increasing demand note.

A Tractor Controlled by Reins (79569 A). Ills. 900 w. Autocar—June 9, 1917. A Canadian design.

Labor Economy of Industrial Trucks and Tractors (79627). Ills. 1500 w. Elec Wld—June 30, 1917. Data on labor saving and cost of operation.

M. O. M. (Ford) Tractor Details (79567 A). Ills. 2000 w. Autocar—June 9, 1917. Design of the gear box.

Rules for 1917 Tractor Demonstrations (80177). 2000 w. Auto—July 26, 1917. Regulations.

Ford Tractor Worm Driven (80765). J. Edward Schipper. Ills. 2000 w. Auto—Aug. 23, 1917. Technical description of features of design.

1917 Tractor Development (80577). A. Ludlow Clayden. Ills. 3000 w. Auto—Aug. 16, 1917. Serial, 1st part. Better protection of gears, more four-cylinder engines, improved arrangements for kerosene burning, and control simplified. Other details.

Remy Tractor Embodies New Principle (80450). 1200 w. Auto—Aug. 9, 1917. Three-wheel design; power through rear wheels.

Specifications for 55 Hp. Track-laying Type Artillery Tractors (80449). 4000 w. Auto—Aug. 9, 1917. Serial, 1st part. Instructions prescribed by ordnance department of U. S. Army.

The Caterpillar Tractor (80247 A). Ills. 2500 w. Machy—Aug., 1917. Design and construction of the Holt tractor.

The Evolution of the Chain-Track Tractor (80785 A). Ills. 2500 w. Engr—Aug. 10, 1917. Serial, 1st part. Reviews the history of development.

The Farm Tractor as Related to the Food Problem (80353 B). H. L. Horning. Ills. 3500 w. S A E, Jl—July, 1917. Advantages of tractor farming. Saving of time.

Burning Kerosene in Tractor Engines (80837 B). W. G. Clark, with discussion. Ills. 6000 w. S A E, Jl—Aug., 1917. Outlines experiments and results, kerosene engine design, use of the fuel, etc.

Governmental Tractor Service (80838 B). 8500 w. S A E, Jl—Aug., 1917. Number of short papers by different authors, discussed together.

Parrett Tractor a Four-Wheel Type (80864). Ills. 2500 w. Auto—Aug. 30, 1917. Direct-driven bell-pulley and a special rear axle construction.

The Tractor From the Viewpoint of Farm Management (80836 B). Arnold P. Yerkes, with discussion. Ills. 3500 w. S A E, Jl—Aug., 1917. Efficient sizes, power possibilities, etc.

Tractor Displaces Horse For Hauling Heavy Artillery (81086). W. F. Bradley. Ills. 4000 w. Auto—Sept. 13, 1917. Developments in this branch of service.

Tractors Often Overdriven (80865). S. C. Turkenkoph. 1500 w. Auto—Aug. 30, 1917. Rough treatment cause of many troubles.

Wallis Tractor Has Novel Frame (80991). Ills. 3000 w. Auto—Sept. 6, 1917. Details of construction which gives a rigid frame and eliminates weight.

Case Two Plow Tractor (82063). Ills. 1800 w. Auto—Oct. 25, 1917. Details of farm tractors.

Severe Tractor Test at Toronto (81476). P. M. Heldt. 2500 w. Auto—Sept. 27, 1917. Account of demonstrations under the auspices of the Provincial Government.

**Transmission**

Old and New Transmissions (76741). Ills. 1500 w. Auto—Feb. 15, 1917. Compares original Packard and Renault gearsets with modern type.

Hydraulic Transmission (77271 A). F. Leigh Martineau. Ills. 25 pp. Instn Aut Engrs—Feb., 1917. Considers it only as applied to automobiles.

**Truck Design**

Lessons of the War in Truck Design (80355 B). W. O. Thomas. Ills. 10500 w. S A E, Jl—July, 1917. Motor transport in England and France; conditions met with; standardization, requirements, design, etc.

**Trucks**

Clean-Up Details of Standard Trucks (81325). A. Ludlow Clayden. 2200 w. Auto—Sept. 20, 1917. Details of design of military trucks.

Motors Superiority in Logging Work Proved by Trucks in Northwest (80897 A). H. H. Harwood. Ills. 2500 w. Com Vhle—Sept. 1, 1912. Reduced haulage cost if loading and unloading facilities are adequate.

Trucks Are Playing Important Part in Building Our National Army Cantonments (80898 A). Joseph Husson. Ills. 2500 w. Com Vhle—Sept. 1, 1917. Serial, 1st part. One Army truck company of thirty cargo vehicles at each camp.

Great Reading Public Served Efficiently by Newspaper Motor Trucks (81864 A). George W. Grupp. Ills. 2200 w. Com Vhle—Oct. 15, 1917. Motors for the Buffalo "Evening News."

Motor Trucks Pay Large Dividends in Farming Work (81572 A). H. H. Harwood. Ills. 1800 w. Com Vhle—Oct. 1, 1917. Report of economic haulage under hard conditions.

**Truck Work**

First Details of the Miraculous Truck Work Performed in Saving Verdun (80309 A). W. F. Bradley. Ills. 2500 w. Com Vhle—Aug. 1, 1917. Account of the service performed by motor trucks in army work.

**Vaporization**

To Ensure Complete Vaporization (80425 A). Ills. 1200 w. Autocar—July 21, 1917. Details of the Brush manifold and cylinder head, which provides a "hot spot" against which unvaporized fuel is directed.

**Welding**

Welding with Application to Automobile Engineering (79981 A). Herbert L. Towns. Ills. Read before Inst. of Auto. Engrs. 5000 w. Engng—June 29, 1917. General discussion of welding methods and applications to the automobile industry.

**Wheels**

Wheels Will Be Metal (81604). A. Ludlow Clayden. Ills. 3500 w. Auto—Oct. 4, 1917. Passenger cars will use pressed steel wheels of many forms.

Wire Wheels (76053 A). James Steelman. Ills. 1200 w. Cas Eng Mthly—Dec., 1916. Processes involved.

**Worm Gears**

Worm Gear and Worm Gear Mounting (75994 N). F. W. Lanchester. Ills. 60 pp. Inst Aut Engrs—Dec., 1916. Detailed discussion of the theory, with an examination of the "solid geometry" of worm gear by a new method.

Worm Gear and Worm Gear Mounting (75882 A). Ills. 1500 w. Autocar—Dec. 23, 1916. Notes on a paper read by F. W. Lanchester.

Worm Gear and Worm Gear Mounting (76739 A). Francis J. Bostock. Ills. 2000 w. Autocar—Jan. 27, 1917. A reply to F. W. Lanchester's paper.

## COMBUSTION MOTORS

**Carburetors**

Carburetor Design—A Study of the State of the Art (80879). Charles Edward Lucke. Ills. 5000 w. A A Wkly—Sept. 3, 1917. Serial, 1st part. Qualitative and quantitative functional design.

**Combustion Motors**

Internal Combustion Engines (76924). 2000 w. Times Eng Supp—Jan. 26, 1917. Review of 1916 in the construction of gas and Diesel type engines, fuel supply, etc.

**Diesel Engines**

Trials on a Diesel Engine, and Application of Energy-Diagram to Obtain Heat Balance (74570 N). F. Trevor Wilkins. Ills. 3300 w. Inst Mech Engrs—Oct. 20, 1916. Trials carried out in the power-station at the University of Birmingham.

The Diesel Engine (75338 B). Chauncey L. Fenton, Lincoln B. Chambers, and Roy R. Lyon. Ills. 36 pp. U S Art, Jl—Nov.-Dec., 1916. Fundamental principles, types, advantages, cost, etc.

The Diesel Engine (75284 A). Rudolf Schlatter. 2500 w. Ice & Refrig—Dec., 1916. Basic principles, essential elements, lubrication, fuel oil, etc.

350 B. H. P. Crosshead Type Diesel Engine (74983 A). Ills. 1500 w. Engr—Nov. 10, 1916. Details of new design.

Trials on a Diesel Engine, and Application of Energy—Diagram to Obtain Heat Balance (75141 A). F. Trevor Wilkins. Read before Inst. Mech. Engrs. Ills. 3500 w. Engr—Nov. 17. 1916. Trials on a small Diesel engine in the power station at the Univ. of Birmingham.

Trial of a 600-B. H. P. Two-Stroke Direct-Reversible Nobel Diesel Engine (75896 A). Ills. & plate. 3500 w. Engng—Dec. 22, 1916. Set of engines built in Petrograd for the twin-screw motor-ship Imperatriza Alexandra.

Diesel Engine Plants (77193). M. William Ehrlich. Ills. 2500 w. Natl Engr—March, 1917. Main and auxiliary equipment, etc.

Six Years' Development of the Werkspoor Marine Diesel Engine (76991 A). Thomas Orchard Lisle. Ills. 2500 w. (Abstract.) A S M E, Jl—March, 1917. Review of types.

Tar Oil Fuel and Diesel Engines (79723 A). Geoffrey Porter. Read before Diesel Engine Users' Assn. 3500 w. Mech Engr—June 22, 1917. Serial, 1st part. Quality of oils and experience in their use.

Lubrication of Diesel Engines (80695 A). R. C. de Mary, in *The Gas Engine*. 1500 w. Mech Wld—Aug. 10, 1917. Requirements for a suitable lubricant and suggestions for selecting oils.

Le Moteur Diesel De Grande Puissance (80744 B). E. Coustet. Ills. 1800 w. La Nat—July 21, 1917. Recent Diesel engines of 4500 h.p. built by Sulzer Brothers, at Winterthur.

**Engines**

Four-Cylinder Double-Acting Gas Engine (75139 A). Ills. & Plate. 1000 w. Engr—Nov. 17, 1916. Two-cycle vertical engine built in Manchester, Eng.

The Internal-Combustion Engine (75412 A). Dugald Clerk, with discussion. 9900 w. Roy Soc Arts. Jl—Dec. 1, 1916. The development and applications.

High-Compression, Heavy Oil Engine Development Predicted (78903). 3500 w. Auto—May 24, 1917. H. G. Chatain analyzes utilization of heavy fuels in Diesel type engines.

**Engine Tests**

Internal Combustion Engine Tests (76388 A). W. A. Tookey. 4000 w. Engr—Jan. 12, 1917. Data based on test results upon piston pressure v. mixture strength basis.

**Efficiency**

L'Amélioration Du Fonctionnement Thermique Des Moteurs A Explosion (80047 B). L. Pierre-Guedon. 2700 w. Gen Civ—July 7, 1917. Improvement in the efficiency of internal combustion motors. Discussion of proposed systems.

**Exhaust Heat**

Utilization of Exhaust Heat From Internal Combustion Engines (80382 A).

Ills. 4500 w. Eng Rev—July 16, 1917. Serial, 1st part. Shows economy practicable and methods of recovering "waste heat."

**Fuels**

The Use of Kerosene and Alcohol in the Gasoline Engines Installed in the Fortifications of the United States (76789 B). Charles O. Schudt and John W. Wallis. 11 pp. U S Art, Jl—Jan.-Feb., 1917. Outlines methods used by successful manufacturers of kerosene engines.

**Gas-Engine Plant**

Sparrows Point Gas-Engine Plant (77769). Julian C. Smallwood. Ills. 3500 w. Power—April 3, 1917. Interesting features of the plant.

**Gas Engines**

See same heading under MINING AND METALLURGY, *Iron and Steel.*

**Gas Power**

Gas Power Sessions (79678 A). 7500 w. A S M E, Jl—July, 1917. Discussions on four papers, on fire-engine tests; motor-truck engines; gas engines; and aeroplane-engine design.

**Gas Producers**

A Gas Producer for Bituminous Fuel (75002 A). O. C. Berry. Ills. 5000 w. A S M E, Jl—Dec., 1916. Types and practice. (Abstract.)

The Commercial Sampling and Analysis of Producer Gas (75003 A). Philip W. Swain. Ills. 3000 w. A S M E, Jl—Dec., 1916. Methods discussed.

A Gas Producer for Bituminous Fuel (76473 A). 2000 w. A S M E, Jl—Feb., 1917. Discussion of O. C. Berry's paper, with closure.

The Extension of Tottenham District Light, Heat and Power Company's Works (80570 A). Ills. & Plate. 3000 w. Engng—Aug. 3, 1917. Drawings and description of the gas-producers, and of the Woodall-Duckham vertical retorts.

**Gas Turbine**

Internal-Combustion Turbine (75065). A. W. H. Griepe. Ills. 1500 w. Power—Dec. 5, 1916. Construction and operation of 100-h.p. turbine.

**Hot-Bulb Engines**

Some Bulb Experiments on Hot Bulb Engines (80786 A). Ills. 2000 w. Engr—Aug. 10, 1917. Experiments with both air and solid injection systems.

**Hydrocarbon Fuels**

Treatment of Hydrocarbon Fuels (81526 B). Henri G. Chatain. Ills. 5500 w. S A E, Jl—Sept., 1917. Processes for converting them into explosive mixtures; development of the art; suggestions, etc.

**Indicator Cards**

Indicateur diagrammen van snelloopende machines (76941 B). E. B. Wolff. Ills. 1400 w. Ingr—Jan. 27, 1917. Indicator diagrams from Diesel engine at various speeds and loads.

How to Interpret Indicator Cards from Diesel Engines (78650). R. E. Neale. 1500 w. Prac Engr, Chi—May 15, 1917. Effects produced by various conditions of load, etc.

**Indicators**

Indicating Gear for Internal Combustion Engines (75983 A). Ills. 1200 w. Engr—Dec. 29, 1916. New form of apparatus designed by A. Ryder.

See also *Submarines*, under MARINE AND NAVAL ENGINEERING.

**Lubrication**

Piston and Small End Lubrication in Diesel Engines (75451 A). George B. Vickers. Read before Diesel Engine Users' Assn. 3000 w. Mech Engr—Dec. 8, 1916. Lubricating oils and top end lubrication.

**Oil Engines**

Oil Engines (74945 A). James C. Kennedy. 2000 w. Ice & Refrig—Nov., 1916. Past and present opinions of their efficiency and operation.

Operation of Low-Compression Type Oil Engines (74290). L. H. Morrison. 1800 w. Power—Oct. 31, 1916. Troubles and how they may be avoided.

Oil Engines as a Relief Against Coal Prices (79146). A. A. Potter. 2000 w. Elec Wld—June 9, 1917. Characteristics of various types and their fields of application.

McEwen High-Compression Oil Engine (80930). Ills. 1000 w. Power—Sept. 4, 1917. Four-cycle, high compression type, operating on the Diesel principle.

**Pre-Heating**

Die Verwertung der Abwärme von Brennkraftmaschinen für Kraftzwecke (76908 B). W. Gentsch. Ills. 3900 w. Zeit des Ver Deutsch Ing—Nov. 25, 1916. Serial, 1st part. Advantage of pre-heating for internal combustion motors.

**Producer Gas**

Producer Gas (77412 A). H. E. Copp. 1500 w. Mech Engr—March 2, 1917. From a paper before Stoke-on-Trent Engrs' & Engrg Students' Assn. Information of different systems of production.

Use of Producer Gas Without Regenerators (80259 A). John H. Bartlett, Jr. Ills. 1000 w. Iron Age—Aug. 2, 1917. Temperature of 21 deg. Fahr. obtained.

See same heading under MINING AND METALLURGY, *Coal and Coke.*

**Spark Plugs**

Spark Plugs (75295 F). J. O. Fisher. 2200 w. Am Soc Nav Engrs, Jl—Nov., 1916. Discussion and specifications.

**Suction Gas**

Suction Gas Production from South African Bituminous Coals (81822 N). F. C. Sturrock and E. J. Way. Ills. 4500 w. So Af Instn Engrs, Jl—Aug., 1917. Experiences and results.

**Traction Engines**

The Internal-Combustion Motor for Traction Engines (74321 A). A. A. Potter and W. A. Buck. Abstract. 1000 w A S M E, Jl—Nov., 1916. Investigation to determine the fuel economy and thermal efficiency of various designs, etc.

**Vaporizing**

Small Power Loss From Holley Kerosene Vaporizer (81479). Ills. 1200 w. Auto—Sept. 27, 1917. Detail improvements in the Holley vaporizing system for kerosene.

## HEATING AND COOLING

**Air Chart**

Synthetic Air Chart (78706 D). E. Vernon Hill, with discussion. 2000 w. Am Soc Ht & Vt Engrs, Jl—April, 1917. Chart, and explanation of its use.

**Air Conditioning**

Air Conditioning for Factory Offices (78761). Ills. 1000 w. Ht & Vt Mag—May, 1917. Equipment for a plant in Milwaukee, Wis.

The Use of Refrigeration in Air Conditioning (78703 D). Lee Nusbaum. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—April, 1917. Methods applied and results secured.

**Air Drying**

Air Drying (76721 A). Carl Hering. 4500 w. Met & Chem Eng—Feb. 15, 1917. Methods of drying.

**Ammonia**

Composition and Testing of Commercial Liquid Ammonia (78094 B). E. C. McKelvy and C. S. Taylor. 20 pp. A S R E, Jl—March, 1917. Tests studied and applied for determining the purity.

Latent Heat of Ammonia (79054 A). Gardner T. Voorhees. 1000 w. Ice & Refrig—June 1, 1917. Curves and equations for solution of problems.

The Chemical Control of Ammonia Oxidation (80274 B). Paul J. Fox. 5500 w. Jl Ind & Eng Chem—Aug., 1917. Methods in the oxidation of ammonia to produce nitrous or nitric acid.

Latent Heat of Pressure Variation of Liquid Ammonia (82052 B). Nathan S. Osborne and Milton S. Van Dusen. 5 pp. A S R E, Jl—Sept., 1917. Gives determination by computation from volumetric data, and determination by direct calorimetric observations, with results.

Latent Heat of Vaporization of Ammonia (82053 B). Nathan S. Osborne and Milton S. Van Dusen. 32 pp. A S R E, Jl—Sept., 1917. Details of apparatus and method used, results and discussion.

Specific Heat of Liquid Ammonia (82051 B). Nathan S. Osborne and Milton S. Van Dusen. 33 pp. A S R E, Jl—Sept., 1917. Details of apparatus and methods used, giving conclusions, with degree of accuracy attainable.

**Ammonia Condenser**

Tests of Atmospheric Ammonia Condenser (79203). G. H. Crawford. Ills. 600 w. Power—June 12, 1917. Results of a test.

**Boilers**

The Testing of House-Heating Boilers (76467 A). Ills. 3500 w. A S M E, Jl—Feb., 1917. Discussion of paper of L. P. Breckenridge and D. B. Prentice at the New York meeting, December, 1916.

**Boiler Testing**

Standard Method of Testing Heating Boilers (78705 D). 22 pp. Am Soc Ht & Vt Engrs, Jl—April, 1917. Report of committee appointed to consider a standard code for testing low-pressure house heating boilers.

**Carbon Dioxide**

The Present Status of the Thermodynamic Properties of Carbon Dioxide (75292 B). Frederick G. Keyes and Arthur W. Kenney. 5000 w. Am Soc Ref Engrs, Jl—Nov., 1916. Best values obtained.

**Car Heating**

Railway Passenger Car Heating (74351 D). Elmer W. Rietz. Ills. 3500 w. Am Soc Ht & Vt Engr, Jl—Oct., 1916. Methods of controlling heat in any type of car.

**Cold Storage**

Development of the Cold Storage Industry. Frank A. Horne. Also, Rise and Development of Cold Storage of Furs and Fabrics. Walter C. Reid (74940 A). 5000 w. Ice & Refrig—Nov., 1916. Changes and improvements; diversity of articles stored, etc.

Central Cold Storage Warehouse, Chicago (81649 A). Ills. 2500 w. Ice & Refrig—Oct., 1917. Describes one of the most modern cold storage plants.

**Combination System**

Combination Absorption and Compression Refrigeration Systems (79274) B. Thoens. Ills. 800 w. Power—June 19, 1917. How combined.

Combining Power, Heating and Ventilation (78782). Ira S. Evans. Ills. 4000

w. Power—May 22, 1917. Serial, 1st part. Comparison of the usual blower system and a combination system.

**Compressors**

A Five Hundred Ton High Speed Booster Ammonia Compressor (75289 B). F. L. Fairbanks. Ills. 1500 w. Am Soc Ref Engrs, Jl—Nov., 1916. Horizontal twin tandem, double-acting, steam driven compressor, using the Laidlaw valve.

A Machineless Air Compressor (75485). Ills. 1500 w. Power—Dec. 26, 1916. Air compressed by falling water.

High Speed Ammonia Compressors (78093 B). C. R. Neeson. Ills. 2500 w. A S R E, Jl—March, 1917. Design to fulfill the requirements.

**Cooling Towers**

A Theory of Cooling Towers Compared with Results in Practice (75291 B). B. H. Coffey and George A. Horne. Third paper of a series. Ills. 3500 w. Am Soc Ref Engrs, Jl—Nov., 1916. Experimental study.

**Condensation**

Returning Condensation to the Boiler (76171). Harold L. Alt. Ills. 2500 w. Ht & Vt Mag—Jan., 1917. Methods suitable for industrial buildings.

**Corrosion**

A Method of Practical Elimination of Corrosion in Hot Water Supply Pipe July, 1917. Schoolrooms, admittedly dry, (76422 D). F. N. Speller. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Details of method of removing the oxygen and carbon dioxide.

Some Thoughts on the Durability of Materials Conveying Steam, Air and Water (76432 D). Ills. 4500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Favors the use of cast iron under certain specified conditions.

**Curing**

Mechanical Curing of Alfalfa (79966 D). E. M. Bassler. 600 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Apparatus and methods used.

**Dehydrating**

Dehydrating Fruits and Vegetables (79964 D). Fred R. Still. 3500 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Shows what may be done to prevent decay.

**Dry Air**

Are Schoolrooms Drier Than Deserts? (79962 D). George T. Palmer. Ills. 4500 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Schoolrooms, admittedly dry, are shown to be not as dangerous to health as deserts.

**Drying**

Artificial Drying, with Special Reference to the Use of Gas (76425 D). Gilbert C. Shadwell. Ills. 4000 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Drying problems in the industries.

Drying by Evaporation (76424 D). Fred R. Still. 3500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Drying methods in the industries.

Drying in Industrial Plants (76426 D). J. O. Ross. 2700 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Types of dryers.

The Theory of Drying and Its Application to the New Humidity Regulated and Recirculating Dry Kiln (77504 N). 28 pp. U. S. Dept. Ag, Bul 509—March 17, 1917. On drying of lumber.

**Drying Foods**

The Preservation of Food Products by Drying (79965 D). Gilbert C. Shadwell. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Methods of preventing decay.

Drying of Fruits and Vegetables (79967 D). Walter M. Schwartz. 1200 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Explains the Proctor system of drying.

**Drying Money**

Drying Money (79963 D). H. C. Russell. Ills. 1500 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Brief description of apparatus and methods.

**Factory Heating**

The Heating and Power Plant of a Modern Industrial Building. (81323). Ills. 2000 w. Ht & Vt Mag—Sept., 1917. Features of equipment in factory of Phoenix-Hermetic Co., Brooklyn, N. Y.

**Fans**

Characteristics of Fan Blades (75106). O. S. Jennings. Ills. 3500 w. Elec Jl—Dec., 1916. Fans of the propeller or disc type.

I. Ventilatori Centrifughi (78261 B). A. Albert. Ills. 3600 w. Mon Tec—Feb. 28, 1917. Various types of ventilating fans; efficiencies, power required and general remarks.

**Flooded Systems**

Circulation in Flooded Systems (79193 B). A. H. Baer. Ills. 11 pp. Am Soc Ref Engrs Jl—May, 1917. Experiments made to secure knowledge of behavior of liquid ammonia evaporation inside of cooling coils.

**Fuel Economies**

Fuel Economies in House Heating (75406). H. R. Johnson. 1500 w. Ht & Vt Mag—Dec., 1916. Methods used in testing and comparison of results.

**Furnace Heating**

Some Notes on Warm Air Furnace Heating (76430 D). Jesse M. McHenry. 1800 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Results of furnace tests in dwelling houses.

Warm Air Furnace Heating (79961 D). I. F. Grumbein. 1800 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Causes of unsuccessful installations.

**Heat Conduction**

The Gas Film Theory in Relation to Heat Conduction, and a Large Table of Heat Conductivities (79595). Halbert P. Gillette. 2500 w. Eng & Con—June 27, 1917. Practical applications of the theory and changes likely to occur as result.

**Heating**

Newly Collected Data on Heating and Ventilation (74659). Edward B. Johnson. 1800 w. Ht & Vt Mag—Nov., 1916. Presented before Munic. Engrs' Soc. of N. Y. as a discussion of Frank G. McCann's paper.

Heating Chicago's Tuberculosis Sanitarium (76950). Thomas Wilson. Ills. 1500 w. Power—Feb. 27, 1917. Interesting installation serving 56,000 sq. ft. of direct radiation.

Typical Details for Hot-Water, Steam, and Hot Blast Heating (78762). T. W. Reynolds. Ills. 1200 w. Ht & Vt Mag—May, 1917.

**Heating Costs**

A Survey of Operating Costs in Thirteen School Buildings (74660). John M. Cushman. 5500 w. Ht & Vt Mag—Nov., 1916. Analysis of the heating and ventilating figures in the Jamestown, N. Y., public schools.

**Heat Loss**

Heat Loss Through Buildings and Building Material (74605 N). R. S. Hawley. 500 w. Col Sl Min Qt—July, 1916. Self-explanatory chart with notes.

Heat Transmission Through Various Types of Sash and the Causes and Prevention of Internal Condensation in Double Glazed Sash (74323 A). Arthur N. Sheldon. Ills. 3000 w. A S M E, Jl—Nov., 1916. Abstract. Report of tests and conclusions.

**Heat Transmission**

Determining Heat Transmission of Compound Walls, with Tests on Insulated Steel Car Sections (75290 B). Arthur J. Wood. Ills. 3500 w. Am Soc Ref Engrs, Jl—Nov., 1916. A study and recommendations.

A Study of Surface Resistance with Glass as the Transmission Medium (81523 A). H. R. Hammond and C. W. Holmberg. 2000 w. A S M E, Jl—Oct., 1917. Tests and results.

The Transfer of Heat Between a Flowing Gas and a containing Flue (81522 A). Lawford H. Fry. Diagrams. 4500 w. A S M E, Jl—Oct., 1917. Gives formula and its applications.

**Heat Waste**

Formula for Calculating the Heat Carried to Waste by the Flue Gases (79811 B). E. A. Uehling. 3000 w. Stev Indic—April, 1917. Formulæ by which the heat losses up the chimney can be calculated.

**High-Pressure Steam**

Heating and Ventilation at Harrison Tech (80539). Ills. 2500 w. Prac Eng, Chi—Aug. 15, 1917. Steam for heating Chicago institution at high pressure.

**Hot Water**

Hot Water Heating (75815 B). Ills. 1500 w. Prac Eng, Chi—Jan. 1, 1917. Systems employed and their connections.

Centrale verwarming door middel van warm water (78264 B). J. W. Lubberhuizen. Ills. 4000 w. Ingr—Mar. 10, 1917. Counter-current hot water heating for dwellings.

**Hot-Water Heating**

Hot Water Heating System of Crane Co. Chicago Works (79960 D). F. E. McCreary. Ills. 15 pp. Am Soc Ht & Vt Engrs, Jl—July, 1917. Details of works heating system, and its application to other shops.

Hot-Water Heating Under Forced Circulation (81676). Charles D. Allan. Ills. 1200 w. Power—Oct. 9, 1917. Serial, 1st part. First of six articles. Present article explains the elemental mechanical principles of hot-water heating.

**House Heating**

Manufactured Gas for House Heating (77449). George S. Barrows and C. C. Winterstein. 2000 w. Ht & Vt Mag—March, 1917. From paper before Am. Gas. Inst. With relative costs of heat energy as supplied by various fuels and district heating systems.

**Humidifiers**

Requirements For Radiator Humidifiers (80634). E. P. Lyon. Ills. 1500 w. Ht & Vt Mag—Aug., 1917. With description of a new type capable of evaporating 2.9 gallons per sq. ft. of hot water radiator per day.

**Humidity**

Something About Humidity (79681). V. R. Gage. 2200 w. Power—July 3, 1917. How measured; how affected by temperature and pressure.

**Ice Plants**

Development of Raw Water Ice Plants (75823 A). Thomas Shipley. Ills. 10,500 w. Ice & Refrig—Jan., 1917. Freezing system, condensing system, compressor and power used.

Performance of Raw Water Can Ice Plants (80563 B). Van R. H. Greene, with discussion. 7 pp. A S R E, Jl—

July, 1917. Limits of organic matter and chemical properties.

**Indirect Heaters**

The Design of Indirect Heaters (78223). Charles L. Hubbard. Ills. 3000 w. Power—April 24, 1917. Details of the usual types, with suggestions on means of support and piping.

**Industrial Buildings**

Requirements for the Heating and Ventilation of Industrial Buildings (76173). 5000 w. Ht & Vt Mag—Jan., 1917. Measures taken in 13 states.

The Heating of Machine Shops (76052 A). Ills. 1200 w. Cas Eng Mthly—Dec., 1916. Methods.

**Intercoolers**

What the Intercooler Can Do (80101). Frank Richards. 3000 w. Power—July 24, 1917. Explains the function of the intercooler in connection with air compressors.

**Oxygen**

The Commercial Production of Oxygen (81067 A). 2500 w. Engng—Aug. 24, 1917. Outlines the liquid air process used to-day, and refers to other processes.

**Pipe Coverings**

Efficiency of Underground Conduit (76428 D). George B. Nichols. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Method of arriving at thermal efficiency of pipe coverings for heating mains.

**Piping**

Correct Method of Piping Dry Returns (80633). Ills. 2200 w. Ht & Vt Mag—Aug., 1917. How "back-firing" and other troubles may be overcome.

**Power Plants**

Power Plant of Wm. L. Dickinson High School (76896). John C. Calahan. Ills. 1500 w. Nat Engr—Feb., 1917. Modern methods of heating, lighting, ventilating, power, and sanitary equipment.

Heating, Ventilating and Electrical Equipments of the Philadelphia Public School Buildings, High and Elementary (76423 D). J. D. Cassell. Ills. 3000 w. Am Soc of Ht & Vt Engrs, Jl—Jan., 1917. Descriptive data.

School Plant for Power, Heating, and Ventilation (76745). Ills. 2000 w. Prac Engr—Feb. 15, 1917. Combination heating system. Air pressure water supply and other features.

**Radiation**

Comparison of Pipe Coils and Cast Iron Sections for Warming Air (78704 D). John R. Allen. Ills. 18 pp. Am Soc Ht & Vt Engrs, Jl—April, 1917. Comparative effects as types of radiation. Results of tests.

Radiation Requirements Under Varying Temperature Conditions (80103). Edward B. Johnson. 1000 w. Ht & Vt Mag—July, 1917. With chart giving graphic solutions for use in weather above and below zero.

**Radiator Valves**

The Operation of Diaphragm Radiator Valves Thermostatically Controlled (78702 D). F. A. De Boos. Ills. 1700 w. Am Soc Ht & Vt Engrs, Jl—April, 1917. Experimental tests and results in actual use.

**Refrigerants**

Latent Heat of Ammonia (77889 A). Gardner T. Voorhees. Ills. 4500 w. Ice & Refrig—April, 1917. Values of latent heat derived by a new method.

**Refrigeration**

Cleaning the Ammonia Charge at the End of the Season (74971). Dr. F. W. Frerichs. 1000 w. Power—Nov. 28, 1916. How to clean absorption and compression systems' ammonic charge. What precautions to use.

Commercial Uses of Refrigerating Machinery (74943 A). S. S. Vanderwaart. 10000 w. Ice & Refrig—Nov., 1916. Its many applications.

Development of Marine Refrigeration (74942 A). 2500 w. Ice & Refrig—Nov., 1916. Historical review.

Development of Pipe Line Refrigeration (74941 A). R. H. Tait. 1800 w. Ice & Refrig—Nov., 1916. Review.

Mechanical Refrigeration (74328). Thomas G. Thurston. 3500 w. Nat Engr—Nov., 1916. Serial, 1st part. How applied; warnings and useful hints to operators.

Principles of Refrigerating Systems (74650). M. A. Sahler. Ills. 1200 w. Com Air Mag—Nov., 1916. Refrigerating agents; compression and absorption systems.

Care and Operation of Ice Machines (75297 F). J. O. Richardson. Ills. 42 pp. Am Soc Nav Engrs, Jl—Nov., 1916. Operation, adjustments, suggestions, troubles, etc.

Exhaust Steam Absorption Machine Efficiencies (75285 A). B. F. Kubaugh. 1800 w. Ice & Refrig—Dec., 1916. Performances that may reasonably be expected in operation.

Installations Frigorifiques (75603 B). G. Lanorville. Ills. 1500 w. La Nat—Dec. 2, 1916. Representative French plants for keeping meats, fruits, and other perishables.

Locating Ammonia Leaks (75488). E. W. Miller. Ills. 2500 w. Power—Dec. 26, 1916. How to make sulphur sticks, Nessler's solution, and how to use litmus paper.

Low Temperature Compression System (75293 B). Harry Sloan. 2000 w. Am

Soc Ref Engrs, Jl—Nov., 1916. Causes of the limitations of the ammonia compressor for low temperature work, and how they may be overcome.

The Flooded System (75286 A). S. S. Wyly. 1800 w. Ice & Refrig—Dec., 1916. Explanation of the system and results obtained.

Piping for Refrigerating Systems (75822 B). Ills. 4500 w. Prac Eng, Chi—Jan. 1, 1917. Fittings for ammonia lines.

The Steam Jet Refrigerating Machine (75865). J. C. Bertsch. Ills. 3000 w. Elec Jl—Jan., 1917. Details of apparatus, attendance, maintenance, cost of production, etc.

Internal Combustion Engines for Ice Plants (76527 A). Arthur Bell. Ills. 4000 w. Ice & Refrig—Feb., 1917. Types in use in ice plant service.

Typical Refrigerating Plants for Ships' Stores on Ocean-Going Cargo Vessels (76518 A). Ills. 1200 w. Int Mar Eng —Jan., 1917. Details of two installations.

Absorption Plant for Distilled Water Ice (76972). Ills. 1800 w. Prac. Eng, Chi—March 1, 1917. Equipment of an Indianapolis plant.

Heat Balance of an Absorption Plant (77902). Julian C. Smallwood. 1800 w. Power—April 10, 1917. Factors involved.

On the Job with the Refrigerating Troubleman (78222). E. W. Miller. 2000 w. Power—April 24, 1917. Account of troubles found.

Refrigeration and its Application to Mining (78053 A). Andrew D. Brydon. 3000 w. Ir & Cl Trds Rev—March 23, 1917. Abstract of paper before the Nat. Assn. of Col. Mgrs. The freezing process and its application to shaft-sinking outlined.

Ammonia and Water Mixer (79194 B). H. Dannenbaum. Ills. 1000 w. Am Soc Ref Engrs Jl—May, 1917. Data on mixer specified in the municipal regulations of the City of New York.

Compound Ammonia Compression (79930). H. J. Macintire. Ills. 1500 w. Power—July 17, 1917. Helpful when using extreme suction and condenser pressures.

Refrigeration in Russia (79694 A). M. T. Zarotchenzeff. 1700 w. Ice & Refrig —July, 1917. Serial, 1st part. Review of refrigerating industry.

Circulation in Flooded Systems (80562 B). A. H. Baer. Ills. 23 pp. A S R E, Jl—July, 1917. Experiments to secure knowledge of behavior of liquid ammonia evaporating inside of cooling coils.

Liquid in Discharge Line Gives Trouble (80361). E. W. Miller. Ills. 1500 w. Power—Aug. 7, 1917. Two ammonia compressors so connected to two condensers that one discharge line was exposed to outside air temperature, crippled the system.

Chicago's Newest Cold Storage (80844). Ills. 2000 w. Prac Eng, Chi—Sept. 1, 1917. New type of ammonia compressors and system of cooling liquid ammonia.

Mean Effective Pressure of Ammonia Compressors (81135). Carl J. Jefferson. 1000 w. Power—Sept. 18, 1917. A new set of M. E. P. tables and their use.

Progress in Brewery Refrigeration (74939 A). G. J. Patitz. 4000 w. Ice & Refrig—Nov., 1916. Historical review.

Refrigeration of Perishable Freight in Transit (74666). M. E. Pennington. Read before Traffic Club of Chicago. Ills. 2500 w. Ry Age Gaz—Nov. 17, 1916. Efficiency of different types, and results.

Refrigeration Twenty-five Years Ago (74938 A). 22 pp. Ice & Refrig—Nov., 1916. A number of short papers by different authors, giving a general review of the industry in the United States.

Review of Some Ammonia Explosions (74291). Charles H. Bromley. Ills. 5000 w. Power—Oct. 31, 1916. Analyses of serious explosions, with suggestions.

Corrosion in Refrigerating Plants (81949). M. A. Saller. 1200 w. Power —Oct. 23, 1917. Causes and remedies considered.

Corrosion of Brine Pipe (82055 D). F. N. Speller. 2000 w. A S R E, Jl— Sept., 1917. Reports recent experience in a skating rink in Pittsburgh, Pa.

Operating a Compression Ammonia Plant (81502). E. W. Miller. 2500 w. Prac Eng, Chi—Oct. 1, 1917. Directions for keeping the charge pure, etc.

**Residences**

Heating and Ventilating Dwelling Houses (75125 A). C. T. Alfred Hanssen. Read before Soc. of Engrs. 3000 w. Surv'r—Nov. 17, 1916. Heat insulation of importance.

**Schoolhouses**

Schoolhouse Heating and Ventilating in Indiana (80102). 5000 w. Ht & Vt Mag —July, 1917. Reviews report of C. B. Veal. Analysis of existing conditions, covering warm air furnace, steam and hot-water systems.

Heating and Ventilating a Portable School House (76431 D). J. R. McColl. Ills. 1500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Outline of system installed in Detroit schools.

**Selling Steam**

Up-to-Date Methods of Selling Steam (78151). Claude Hartford. Ills. 1200 w. Ht & Vt Mag—April, 1917. Methods of getting new business.

**Skating Rink**

An Exceptionally Fine Ice Skating Rink (77890 A). Ills. 2500 w. Ice & Refrig—April, 1917. In Chicago.

World's Largest Ice Skating Arena (78648). Ills. 1800 w. Prac Eng, Chi—May 15, 1917. Chicago rink, costing $520,000.

Ice Skating Rinks (82054 B). M. R. Carpenter, with discussion. Ills. 16 pp. A S R E, Jl—Sept., 1917. Summary of essential points to be considered.

**Steam Heating**

The Transmission of Steam in a Central Heating System (76429 D). J. H. Walker. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Method worked out in Detroit.

Measurements of Low Pressure Steam Used for Heating the Buildings of the University of Michigan (79968 D). J. E. Emswiler. Ills. 2500 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Data relative to the amount of steam required and the velocity with which steam is conveyed through some of the pipes.

The Transmission of Steam Heat from Central Plants (80104). W. H. Pearce. 1400 w. Ht & Vt Mag—July, 1917. Reviews the history of steam transmission.

**Steam Plant**

New High-Pressure Central Steam Plant (76514). Claude Hartford. Ills. 1800 w. Power—Feb. 6, 1917. Station at Burling Slip, New York, for supplying steam to many large buildings.

Notes on the Testing of Heating and Ventilating Equipment (79971 D). Dwight D. Kimball, J. Irvine Lyle, Arthur K. Ohmes. Ills. 30 pp. Am Soc Ht & Vt Engrs, Jl—July, 1917. Testing methods and apparatus used.

**Theory**

An Outline of the Theory of Heat Transmission and Absorption in Application to Ordinary Engineering Problems (77464 B). John E. Bell, with discussion. Ills. 49 pp. Engrs' Soc W Penn, Pro—Jan., 1917.

**Valves**

Compressor Valves — A Review (78032). F. L. Fairbanks. Ills. 2000 w. Power—April 17, 1917. Abstract from *Refrigerating World*. Faults and merits of various types, with particular reference to ammonia compressors.

Compressor Valves (80698 A). F. L. Fairbanks, in *Refrig. Wld.* Ills. 2000 w. Mech Wld—Aug. 10, 1917. Points out merits and defects of plate valves.

**Ventilation**

Remodeling the Ventilation of a Theatre (74349 D). Samuel R. Lewis. Ills. 2500 w. Am Soc Ht & Vt Engr, Jl—Oct., 1916. Experiences with heating a very large theatre.

Betrachtungen über Mechanische Lüftung (75561 B). K. Meier. Ills. 3000 w. Schweiz Ban—Nov. 11, 1916. Mechanical ventilation as applied to schools and other public buildings in the United States and Europe.

Speed Control of Direct-Current Motors in Ventilating Service (75405). B. N. Strader. 1500 w. Ht & V tMag—Dec., 1916. Methods.

Moderni Concetti Sugli Impianti di Ventilazione (76209 B). A. Albert. Ills. 3100 w. Mon Tec—Nov. 20, 1916. Theory of ventilation and calculations.

An Improvement in Ventilating Apparatus (76427 D). William J. Baldwin. Ills. 1800 w. Am Soc Ht & Vt Engrs, Jl—Jan., 1917. Apparatus called an "aero-hydro fan-separator."

Le Proprieta Caratteristiche dei Ventilatori a Reazione (76904). B. A. Albert. Ills. 2900 w. Mon Tec—Dec. 30, 1916. Serial, 1st part. Characteristics of various types of ventilating fans.

Remodeling the Ventilation of a Theatre (77448). Samuel R. Lewis. 3000 w. Ht & Vt Mag—March, 1917. Changes to overcome unsatisfactory ventilation.

Ventilation of Engine and Boiler Rooms (77195). Charles L. Hubbard. Ills. 3000 w. Natl Engr—March, 1917. Methods available.

Ventilation Standards (79958 D). Dr. E. V. Hill. Ills. 21 pp. Am Soc Ht & Vt Engrs, Jl—July, 1917. Results of tests made to determine a comfort zone. Charts for recording tests.

The Theoretical Consideration of the Ventilation of Sub-stations and Transformer Houses (80384 A). T. H. Wood. Ills. 1700 w. Elec Rev—July 20, 1917. Theory and practice in ventilation.

Factors in the Ventilation of Schools, Assembly Halls and Business Buildings (81557 A). George E. Reed. 2500 w. Ore Soc Engrs, Jl—Sept., 1917. Discusses artificial ventilation, air washers, air filters, etc.

**Welded Pipe**

Safety Preparedness (75824 A). F. E. Matthews. Chart. 2800 w. Ice & Refrig—Jan., 1917. Safety factor in lap welded and autogenous welded ammonia pipe and receivers.

**Windows**

Windows (74350 D). E. Vernon Hill. Ills. 5000 w. Am Soc Ht & Vt Engr, Jl—Oct., 1916. Objections to their indiscriminate use, and advantages derived.

# HYDRAULIC MACHINERY

**Air Lifts**

Pumping With the Air Lift (75699). J. F. Springer. Ills. 4000 w. Mun Jl—Jan. 4, 1917. Theory of operation; development of apparatus, etc.

**Centrifugal Pumps**

Centrifugal Boiler - Feed Pumps (74288). Otto Haentjens and Eduard F. Barrett. Ills. 3500 w. Power—Oct. 31, 1916. Features of construction necessary for economical operation.

The Selection of Centrifugal Pumps (74306 A). D. McEoceid. 1000 w. Engr—Oct. 13, 1916. Method for determining which machine will best fulfill conditions.

Finding the Economical Suction Lift of a Centrifugal Pump (77020). Otto Haentjens. Ills. 1800 w. Eng News—March 1, 1917. Diagrams and methods.

The Design of Centrifugal Circulating Pumps (81051 A). Theodore Tohlin. Ills. 1800 w. Am Soc Mar Dftn, Jl—July, 1917. Confined to the single stage scroll casing type.

Wirtschaftlichkeit der Wasserkraftwerke (82001 B). W. Zuppinger. Ills. 8200 w. Schweiz Bau—Sept. 15, 1917. Serial, 1st part. Improved design of water turbine and centrifugal pump for maximum performance.

Centrifugal Pumps (81501). H. S. Budd. Ills. 3500 w. Prac Eng, Chi—Oct. 1, 1917. Development, types, application to various services.

**Floods**

De door "Werkspoor" vervaardigde pompwerktuigen voor de bemaling van de overstroomde gedeelten (78860 B). G. J. Lugt. Ills. 2900 w. Ingr—Apr. 21, 1917. Large installation of centrifugal pumps for relieving inundated districts of North Holland.

**Flow**

Some Notes on Stream Flow (77277 A). G. C. Brown. 1800 w. Corn C E—Jan., 1917. Lessons from a study of a single discharge section of the Beaver River, at Newport, Pa.

**Governors**

Bericht über neue Geschwindigkeits-Regulatoren (79414 B). F. Prasil. Ills. 2600 w. Serial, 1st part. Schweiz Bau—May 26, 1917. Recent designs of water turbine governors by Escher Wyss & Co., Zurich.

**Hydraulics**

Hydraulic Power (74330). Charles L. Hubbard. Ills. 2200 w. Nat Engr—Nov., 1916. Serial, 1st part. Its development and how computed.

**Prime Movers**

See STEAM ENGINEERING.

**Pumping Plant**

Flexible Floating Pumping Plant on Calumet-Sag Channel (74523). Ills. 500 w. Eng & Con—Nov. 8, 1916. Detailed description.

**Pumps**

The Condensation Pump: An Improved Form of High Vacuum Pump (75093 A). Irving Langmuir. Ills. 6000 w. Gen Elec Rev—Dec., 1916. Detailed description of improved pumps and their operation.

The Condensation Pump: An Improved Form of High Vacuum Pump (75340 B). Irving Langmuir. Ills. 24 pp. Fkn Inst, Jl—Dec., 1916. Modifications of mercury vapor pumps.

Selection of Pumps for Municipal Plant at Santa Clara, Caliornia (77907 A). George L. Sullivan. Ills. 800 w. West Eng—April, 1917. Abstract of report to board of trustees.

Centrifugal Pumps (80212). H. S. Budd. 3500 w. Natl Engr—Aug., 1917. Types, their classification and uses, design, constructional features, etc.

Pumps For Operating Hydraulic Presses (80253 A). A. Lewis Jenkins. Ills. 1800 w. Machy—Aug., 1917. Formulae for determining sizes of one,- two,- and three-plunger pumps.

**Pump Test**

Test of a Four-Inch Single-Stage Turbine Pump (76354). J. H. Parkin. Ills. 1500 w. Can Engr—Jan. 25, 1917. Method of conducting test; discussion of results.

**Sand Settling**

Sand-Settling Basin for Hydraulic Plants (80781 A). Ills. 900 w. Engng—Aug. 10, 1917. Arrangement adopted in Switzerland, due to J. Buchi, of Zurich.

**Sinking Pumps**

Observations on Sinking Pumps (80482). J. F. Kellock Brown. Ills. 3000 w. Eng & Min Jl—Aug. 11, 1917. Some of the weak points in their design.

**Syphon**

The Horsley and Nicholson Automatic Compound Syphon (78574 A). George R. Nicholson. Ills. 1500 w. Colly Gdn—April 20, 1917. Describes apparatus and explains theory.

The Horsley and Nicholson Automatic Compound Syphon (79363 N). George R. Nicholson, with discussion. Ills. 2500 w. Instn Min Engrs. Trans—May, 1917. Description, with theoretical exposition of its action.

**Turbine Pumps**

Notes on the Construction of Turbine Pumps (79308 A). Alan E. L. Chorlton. Read before the Inst. of Mech Engrs. Ills. 1200 w. Mech Wld—June 1, 1917.

Serial, 1st part. Practical notes on design and construction.

Turbine Pumps (79441). 1300 w. Times Eng Supp—May 25, 1917. Design and construction of centrifugal pumps. From paper by A. E. L. Chorlton before Institution of Mechanical Engineers.

**Water Turbines**

Plotting Water Turbine Characteristics (77221). Jesse W. Shuman. Charts. 1600 w. Eng Rec—March 10, 1917. Permit quick estimate.

Pitting of Water Turbines and Their Design (79159 B). S. J. Zowski. Ills. 21 pp. West Soc Engrs Jl—April, 1917. Shows the designer has considerable control over pitting.

Nota Sulle Turbine Idrauliche (79401 B). Ills. 2600 w. Ind—May 20, 1917. Modern types of turbines described and installations shown.

# MACHINE ELEMENTS AND DESIGN

**Balancing**

Balancing Rotating Parts: Graphical Treatment (80971 A). Ewart S. Andrews. Ills. 1000 w. Mech Wld—Aug. 17, 1917. Serial, 1st part. Procedure to prevent the existence of the centrifugal forces which cause uneven running.

**Bearings**

Design of Oil Ring Bearings (75797). William Knight. 5000 w. Power—Jan. 9, 1917. Main points to be considered. Prevention of leakage.

Using Ball Bearings (75851 A). Otto Breuenauer. Ills. 4000 w. Machy—Jan., 1917. Care, storing, handling, and mounting.

Ball Bearings (78570 A). A. Marshall Arter. 1800 w. Mech Wld—April 20, 1917. Serial, 1st part. Read before Soc. of Engrs. Importance of accuracy; relation of load and revolutions of balls.

Electric Steel for Roller Bearings (80412 A). Ills. 2000 w. Iron Age—Aug. 9, 1917. New type of ingot-handling machine.

Characteristics of Roller Bearings (81653). P. B. Liebermann. Ills. 2000 w. Bt Fc & St Pt—Oct., 1917. Comparison of solid and flexible roller bearings.

**Brakes**

Friction Brakes (80083 A). William E. Wright. 1000 w. Mech Wld—July 6, 1917. Serial, 1st part. Calculations involved in considering the various forms.

**Cams**

Design and Construction of Textile Machinery Cams (74756 A). Sumner B. Sargent. Ills. 1000 w. Mech Wld—Nov. 10, 1916. Designs a set of loom cams.

Design of Spinning Frame Cams (75131 A). S. B. Sargent. Ills. 1500 w. Mech Wld—Nov. 24, 1916. Detailed directions.

Cam Design and Construction (78569 A). Charles F. Smith. Ills. 1800 w. Mech Wld—April 20, 1917.

Cam Layout For Loom Harnesses (80653). Charles F. Merrill. Ills. 1500 w. Am Mach—Aug. 23, 1917. Data for laying out the cams used to control the movements.

Location of Cam Followers (81246). Arthur B. Babbitt. Ills. 1000 w. Am Mach—Sept. 20, 1917. Serial, 1st part. Various possibilities of design.

**Change-Gears**

Simplified Change-Gear Calculations (78435 A). George M. Meyncke. 8500 w. Machy—May, 1917. Solving change-gear problems by use of logarithms.

**Charts**

Alignment Charts: Their Design and Construction, With an Application to the Design of Spur-gears (77931 A). Robert F. McKay. 1000 w. Mech Wld—March 30, 1917. Serial, 1st part. Principles and rules governing their construction.

**Clutches**

Friction Clutches (74565 N). William G. Gass. Ills. 6000 w. Manr Assn Engrs—Oct. 28, 1916. Reviews general types, their weaknesses, etc.

**Contact Movements**

The Nature of Rolling and Sliding Between Bodies in Direct Contact (75428 A). Leslie D. Hayes. Ills. 1800 w. Sib Jl Eng—Dec., 1916. Deduces theory.

**Crane-Jib**

Crane-Jib Design (78641 A). Ills. 1800 w. Mech Wld—April 27, 1917. Methods of design.

**Crankshafts**

Roller and Ball Bearings for Crankshafts (78655 A). Granville E. Bradshaw. Ills. 2500 w. Autocar—April 28, 1917. How they save trouble and expense.

**Design**

Importance of the Drafting Department in an Engineering Organization (74431 A). W. E. Blaine. 1200 w. Am Soc Mar Dn—Oct., 1916. Instructions in triplicate; rush work; advancing men.

Origination versus Imitation in Design (74278 A). R. H. McMinn. 1500 w. Machy—Nov., 1916. Importance of becoming acquainted with all machinery.

Practical Suggestions in Machine Design (74432 A). W. T. Walters. 1400 w. Am Soc Mar Dn—Oct., 1916. From the standpoint of the machinist who will operate the machine.

**Designing**

Schemes That Didn't Work (79666 A). F. B. Jacobs. Ills. 2500 w. Machy—July, 1917. Faults in machine designs.

Some Points in High Precision Design (80086 A). 2200 w. Engr—June 29, 1917. Trend of modern design in high precision machinery.

**Dies**

Compound Sub-Press Watch Dies (79669 A). W. H. Dunbrack. Ills. 4500 w. Machy—July, 1917. Making master and working punches and dies.

Forming Milk-Can Handles on a Power Press (80852 A). Ernest A. Walters. Ills. 700 w. Machy—Sept., 1917. Design of dies for combined drawing and bending.

Relation of Press Stroke to the Life of a Die (81242). E. F. Creager. Ills. 2000 w. Am Mach—Sept. 20, 1917. Decreasing press stroke increases the life of a punch and die.

**Drawings**

Engineers' Drawings (80387 A). Joseph Horner. 2000 w. Mech Wld—July 20, 1917. Explanations and suggestions.

**Drill Chucks**

Drill Chucks (76442 A). Joseph Horner. Ills. 4000 w. Machy—Feb., 1917. Principles governing design and methods of operation.

**Flywheels**

Design of Flywheels (78550 A). H. J. Macintire. Ills. 1200 w. Ice & Refrig—May, 1917. Methods used in designing flywheels for engines and compressors.

**Gages**

Gaging Systems for Screws and Taps (79664 A). Ills. 800 w. Machy—July, 1917. Devices for measuring variations in lead and diameter.

National Supervision of Gages (79663 A). William T. Iler, Jr. Ills. 1600 w. Machy—July, 1917. Examples of difficulties to be met by munition manufacturers, and tool and gage-makers. Remedy.

Precision Thread Gages (80555). E. A. Suverkrop. Ills. 2500 w. Am Mach—Aug 16, 1917. Details of manufacture from the shop man's viewpoint.

Master Whitworth Thread Gages (80855 A). W. T. Iler, Jr. 1000 w. Machy—Sept., 1917. Details of difficult work.

Practical Points in Flat-Gage Making (80832). Hugo F. Pusep. Ills. 3300 w. Am Mach—Aug. 30, 1917. Steps in making flat-gages in quantities.

Production of Accurate Thread Gages (80849 A). J. R. Macintyre. Ills. 1800 w. Machy—Sept., 1917. Methods used in making thread-cutting and radius-forming tools and angle-grinding fixtures.

Elements of Gagemaking (81244). C. A. Macready. Ills. 2200 w. Am Mach—Sept. 20, 1917. Serial, 1st part. Suggestions for the higher classes of gage-making work.

**Gauges**

Notes on Screw Gauges (76169 N). R. E. B. Crompton. 14 pp. Inst Aut Engrs—Jan., 1917. On the interchangeability of screws.

The Manufacture of Gauges (76698 A). A. G. Cooke, W. J. Gow, and W. G. Tunnicliffe. 1500 w. Mech Wld—Jan. 26, 1917. Serial, 1st part. Read before Inst. of Mech Engrs. Workshop details and methods of securing accuracy.

Making Snap-Gauges (78640 A). F. B. Jacobs. Ills. 1500 w. Mech Wld—April 27, 1917. Explains methods used by American manufacturers.

The Manufacture of Hardened Thread Gauges (81861 A). G. Doorakkers. Ills. 2000 w. Engr—Sept. 28, 1917. Serial, 1st part. A mechanical way of checking which compares favorably with the optical way, and details of manufacture.

**Gears**

Spiral Type Bevel Gears (74277 A). Reginald Trautschold. Ills. 3500 w. Machy—Nov., 1916. Conditions governing design, with examples.

Internal Spur Gearing (75846 A). Reginald Trautschold. Ills. 2500 w. Machy—Jan., 1917. Designing and machining.

Theory of Enlarged Herringbone Pinions (75845 A). E. W. Miller. Ills. 1500 w. Machy—Jan., 1917. Formulæ for designing pinions to avoid the disadvantage of under-cut.

Internal Helical Gearing (76447 A). Reginald Trautschold. Ills. 4000 w. Machy—Feb., 1917. Normal pitch and circular pitch; curvature of teeth; interference, proportions, strength, etc.

Formulæ for Epicyclic Gears (77413 A). T. H. Webster. Ills. 800 w. Mech Wld—March 2, 1917. Diagrams and list of formulæ.

Internal Bevel Gearing (77070 A). Reginald Trautschold. Ills. 3000 w. Machy—March, 1917. Designing and machining gears of varying and parallel-depth types.

Gaging and Inspecting Gears (77754 A). Douglas T. Hamilton. Ills. 9 pp. Machy—April, 1917. Fixtures for testing pitch, pitch diameter, tooth shape, tooth thickness and concentricity.

Gearing Development through Treatment (77774). W. H. Phillips. 2000 w. Bt Fc & Stl Pt—April, 1917. Shows how heat-treatment can add to life and service of rolling-mill gear trains.

Efficiency of Forward and Reverse Drives (79667 A). John S. Myers. Ills. 5000 w. Machy—July, 1917. Graphic methods for determining efficiency of worm-gears and spur-gears.

Epicyclic Gear Trains (79670 A). Reginald Trautschold. Ills. 6500 w. Machy—July, 1917. Fundamental principles, formulæ, and common applications.

The Maag Gear System (79948). Dexter S. Kimball. Ills. 2500 w. Am Mach—July 19, 1917. Details of this system and methods of production.

Machine-Cut Elliptical Gears (80249 A). Reginald Trautschold. Ills. 5000 w. Machy—Aug., 1917. Laying out and machining.

Design and Use of Twisted Spur Gears (80933). L. D. Hayes. Ills. 3500 w. Am Mach—Sept. 6, 1917. A plea for more careful use of names as applied to twisted spur gears and helical gears.

Tool Steel Gears and Pinions for Mill and Industrial Service (81275 N). E. S. Sawtelle. 3500 w. Assn I S E E—Sept., 1917. Details of a special process of hardening, its advantages, etc.

**Jigs**

Small Drill Jigs and Clamping Devices for Component Machine Parts 79303 A). Ills. 1500 w. Mech Wld—May 25, 1917. Types described.

**Lodge, William**

William Lodge (78896 A). Photograph. 1200 w. Ind Man—June, 1917. Biographical sketch of one of the best known men in the machine tool industry.

**Machine Design**

Use of Diagrams in Machine Design (78483 A). J. W. Wunsch. Ills. 500 w. Machy—May, 1917. Value of analysis of mechanical movements in laying out automatic machines.

**Machine Tools**

Increasing Use of Secondary Machine Tools (78847 A). C. A. Tupper. 2000 w. Mech Wld—May 11, 1917. Serial, 1st part. Improvements in design which have raised them to higher service.

**Mill Housings**

Investigation of Stresses in Mill Housings (80345). J. D. Keller. Ills. 2500 w. Bt Fc & St Pt—Aug., 1917. Stresses caused by spreading forces on the rolls.

**Models**

An Astronomical Model (79316 A). Ills. 3000 w. Engr—June 1, 1917. Detailed description of model made by W. Wilson, illustrating the relative movements of the sun, earth, and moon.

**Money Machine**

Building a Payroll Machine (81567). M. E. Hoag. Ills. 1500 w. Am Mach—Oct. 4, 1917. Brief outline of the action and use of the International Money Machine. Various fixtures and gages described.

**Munition Work**

Munition Work and Machine Tools (77575). 2600 w. Times Eng Supp—Feb. 23, 1917. Influence of munition work conditions on design of machine tools.

**Reamers**

The Arrangement of Reamer Flutes (81318 A). George W. Burley. Ills. 1500 w. Mech Wld—Sept. 7, 1917. Methods of setting out reamer teeth.

**Rifles**

The Modified Enfield Rifle, Model 1917 (81459). Ills. 1200 w. Am Mach—Sept. 27, 1917. Mechanism and action, showing changes made in the English rifle to fit it for Springfield ammunition.

U. S. Automatic Machine Rifle—Caliber 30, Model 1909 (81039). Ills. 9500 w. Am Mach—Sept. 13, 1917. This type is air-cooled, but the radiating surface is not covered. Explains the mechanism.

**Rolls**

Roll Design for Shrapnel and Shell Bars (79806). W. S. Standiford. Ills. 2000 w. Bt Fc & St Pt—July, 1917. Angle grooves, finishing and roughing rolls, etc.

Roll Pass Design For Standard Rails (80348). W. S. Standiford. Ills. 4500 w. Bt Fc & St Pt—Aug., 1917. Practice in several rail mills.

**Screw Threads**

See same heading under *Machine Elements and Design.*

**Springs**

Springs (77163 A). C. E. Squire. Abstract of paper before Jun. Inst. of Engrs. 3000 w. Elect'n—Feb. 16, 1917. Principal kinds and the manufacture, testing, etc.

Springs (75266 A). C. E. Squire. Read before Jun. Inst. of Engrs. Ills. 3500 w. Mech Engr—Dec. 1, 1916. Serial, 1st part. Kinds, their history, manufacture, testing, etc.

**Standard Bolts**

Boulons, Goujons Et Vis D'Assemblage (79412 C + D). Ills. 3900 w. Soc Enc Ind Nat—Mar.-Apr., 1917. Results of work of French committee on standard sizes and threads for machine bolts and nuts.

**Standardization**

Manufacturing Conditions in the Electrical Industry (78963 A). D. B. Rushmore and E. W. Pilgrim. Ills. 3500 w. Gen Elec Rev—June, 1917. Plea for standardization of electrical apparatus wherever conditions will permit.

Standardization In Engineering (79442). 2600 w. Times Eng Supp—May 25, 1917. Work of British Committee on the subject. Organization, financing and new developments.

**Toggle Joint**

Emploi Du Système De Calage A Leviers Coudes' (77605 B). M. Boucher. Ills. 2200 w. Gen Civ—March 10, 1917. Use of toggle joints in swing bridges.

**Tools**

Examples of Expensive Tool Designing (77069 A). F. B. Jacobs. Ills. 2000 w. Machy—March, 1917. Cost of faulty design are shown.

**Worm-Gearing**

Internal Worm-Gearing (77755 A). Reginald Trautschold. Ills. 4000 w. Machy—April, 1917. Advantages and peculiarities of construction; methods of making.

The Efficiency of Worm-Gears (74486 A). Robert F. McKay. 900 w. Mech Wld—Oct. 27, 1916. Mathematical.

## MACHINE WORKS AND FOUNDRIES

**Abrasives**

Two Years' Growth of an Abrasive Industry (76313 A). W. E. Freeland. 3500 w. Iron Age—Jan. 25, 1917. The Norton Co. as an example of the expansion of grinding wheel plants.

**Aluminum**

Melting Aluminum Chips (74336). H. W. Gillett and G. M. James. 80 pp. U S Bur Mines—Bul. 108. Experiments to determine the most promising methods.

**Angle-Plates**

Angle-Plates as Jigs (74485 A). G. W. Smith. Ills. 1200 w. Mech Wld—Oct. 20, 1916. Examples of their use.

**Annealing**

The Annealing of Nickel-Silvel (Part II.) (77942 N). F. C. Thompson. 16 pp. Inst Met—March 21, 1917. The effect of the duration of annealing at a definite temperature and observations which bear upon the influence of the rate of cooling.

Annealing Temperatures and Grain Growth (79516 N). D. J. McAdam, Jr. Ills. 16 pp. Am Soc Test Mat—June, 1917. Described observations and experiments on "Admiralty Metal" and on cold-wrought ingot iron.

Flash Annealing Large Projectiles (80877 A). Edward A. Pilnacek. Ills. 700 w. Met & Chem Eng—Sept. 1, 1917. How satisfactory results were obtained.

**Axles**

Timken Plant for Heat-Treating Axles (81566 A). Ills. 2000 w. Iron Age—Oct. 4, 1917. Special equipment for reducing costs. Producer gas used as fuel.

**Band-Saws**

The Care and Upkeep of Band-Saws (81042). Ills. 4500 w. Am Mach—Sept. 13, 1917. Details needing care, and the importance if the work.

**Bayonets**

The Bayonet (80283). Ills. 4500 w. Am Mach—Aug. 2, 1917. Serial, 1st part. Operations on the three types of bayonets.

**Bearings**

See same heading under Marine and Naval Engineering.

**Belts**

Belting (77727). Ills. 2200 w. Prac Eng, Chi—April 1, 1917. Serial, 1st part. Its manufacture; methods of splicing, etc.

**Boiler Repairs**

Boiler Repairs Made by Oxy Acetylene and Electric Welding at the Atlantic Coast Line Shops, Waycross, Georgia (74802 A). D. M. Pearsall, with discussion. Ills. 6000 w. S & S W Ry Cb—Sept., 1916. Methods and results.

**Boring Machine**

Boring and Recessing Machine for Aircraft Manufacture (78216 A). Ills. 1000 w. Engr—March 30, 1917. Detailed description.

**Boring Tools**

Boring Tools (80385 A). Joseph Horner. Ills. 2500 w. Mech Wld—July 20, 1917. Serial, 1st part. Reviews designs.

**Bottle Making**

A Modern Bottle Making Plant (80085 A). Ills. 1800 w. Engr—June 29, 1917. Practice at the Thatcher plant, at Elmira, N. Y., devoted to the making of milk bottles.

**Brass**

Brass Manufacture in a Modern Plant (77673 A). W. E. Freeland. Ills. 3500 w. Iron Age—March 29, 1917. Serial, 1st part. Practice as illustrated by the Stamford (Conn.) Rolling Mills Co.

On Machining Properties of Brass (77939 N). Owen Wm. Ellis. 400 w.

Inst Met—March 21, 1917. Explained by considering microstructures.

Light versus Heavy Reductions in Cold Working Brass (79494 N). W. Reuben Webster. Ills. 5 pp. Am Soc Test Mat—June, 1917. Investigations and results.

Fuel Gas Most Economical for Brass Melting (81972). S. S. Amdursky. Ills. 2500 w. Brs Wld—Oct., 1917. Arguments for gas fuel as superior to oil, coal or coke, and details of gas furnaces.

**Breakdowns**

Keeping Machines on the Job (79904). Byron T. Hawley. 2500 w. Am Mach—July 12, 1917. Suggestions for preventing breakdowns.

**British Industries**

Presidential Address to the Institution of Mechanical Engineers (78670 A). Michael Longridge. 9500 w. Engng—April 27, 1917. Reviews the evolution of mechanical engineering; British pre-eminence, and efforts to maintain its supremacy.

**Gages**

Making Limit Gages (74285 A). F. B. Jacobs. Ills. 2000 w. Machy—Nov., 1916. Describes economically constructed gages used in production of automobile parts.

**Cannon Making**

Cannon Making in Past Centuries (81686). H. H. Manchester. Ills. 1100 w. Am Mach—Oct. 11, 1917. Methods used in the 13th, 14th, and 15th centuries.

**Carbonizing**

Equipment for Carbonizing Purposes (77815 A). Ills. 500 w. Iron Age—April 5, 1917. Arrangement of a recently constructed cementation plant.

**Cardboard Work**

Cardboard Forming (80850 A). R. A. Monte. Ills. 2000 w. Machy—Sept., 1917. Details of work in forming and pressing cardboard shapes.

**Case-Hardening**

Exfoliation and Carbon Concentration in the Case-Hardening of Steel (78022 A). Edwin P. Stenger. Ills. 5000 w. Met & Chem Eng—April 15, 1917. Principles and phenomena underlying the cementation process.

The Case-Hardening of Iron by Boron (78803 N). N. Tschischewsky. Ills. 700 w. Ir & St Inst—May, 1917. Conditions and applications.

**Castings**

Molding and Casting Cylinder Liners (74987 A). F. Andrew. Ills. 1400 w. Mech Wld—Nov. 17, 1916. Improved method.

A New Converter Steel Casting Plant (76568 A). Ills. 1200 w. Iron Age—Feb. 8, 1917. Details of plant at Cleveland, Ohio.

Manufacture of Steel Castings (76374 A). Ernest F. Lange. Abstract of paper before Manchester Assn. of Engrs. Ills. 3500 w. Mech Engr—Jan. 19, 1917. Serial, 1st part. Crucible steel processes are considered.

The Seasoning of Castings (76596 D). Richard Moldenke. 2000 w. A I M E, Bul—Feb., 1917. Strains in castings.

How to Eliminate Sulphur Holes in Castings (77095). Edgar Allen Custer, Jr. 1200 w. Fndry—March, 1917. Explains remedy applied.

The General Properties of Stampings and Chill Castings in Brass of Approximately 60:40 Composition (77938 N). Owen Wm. Ellis. 18 pp. Inst Met—March 21, 1917. Research to ascertain causes of variations in machining properties and means for lessening them.

The Seasoning of Castings (78128 D). 3500 w. A I M E, Bul—April, 1917. Discussion of Richard Moldenke's paper.

Influence of Gases in Cast Metal (78382 A). J. E. Fletcher. Abstract of paper before British Found. Assn. Ills. 4000 w. Mech Engr—April 13, 1917. A study of the gas influence, showing its importance.

Production of Aluminum Castings (78384 A). J. Gaunt. 2000 w. Mech Wld—April 13, 1917. Serial, 1st part. Read before British Found. Assn. Alloys used; the melting, casting temperature, molding, etc.

Castings from Acid and Basic Electric Steel (79068). A. Walter Lorenz. 3000 w. Fndry—June, 1917. Suggestions from an operator bearing upon this proceess.

Casting Chilled Car Wheels in a Canadian Foundry (80262). C. E. Gray. Ills. 2200 w. Fndry—Aug., 1917. Methods of Can. Pac. Ry. Co. to insure sound wheels.

Progress in the Manufacture of Steel Castings (80268). Robert P. Lamont. Ills. 5500 w. Fndry—Aug., 1917. Development of this industry.

The Use of Chills in Producing Sound Castings (80263). 4000 w. Fndry—Ang., 1917. Abstracts of recent papers by various authors, dealing with how to control the action as the metal passes from the liquid to the solid state.

Making Machinable Castings From Permanent Iron Moulds (81179 A). Ills. 1500 w. Engng—Aug. 31, 1917. From address of Alexander E. Outerbridge, Jr., to the Phila. Found. Assn. Statement of successful practice and experience.

Structure of Iron Cast in Metal Molds

(81281 A). Edwin F. Cone. Ills. 1000 w. Iron Age—Sept. 20, 1917. Comparison with iron cast in sand molds. Relative size of microconstituents.

Common Sources of Error in Castings (81843 A). Joseph Horner. 3000 w. Mech Wld—Sept. 28, 1917. Calls attention to causes, and suggests remedies.

Bronze Die Castings (81970). C. Vickers. Ills. 2000 w. Brs Wld—Oct., 1917. Methods and best present practice.

Producing Machinable Malleable Iron Castings (81656 A). A. T. Jeffery. Read before Am. Found. Assn. Ills. 2200 w. Fndry—Oct., 1917. (Special No.) Causes of troubles in the machine shop, and how avoided.

Production of Aluminum Castings (81971). J. Gaunt. 4000 w. Read before British Found Assn. Brs Wld—Oct., 1917. Casting temperature, molding, cores, etc.

Steel Castings for Ordnance Construction (81657 A). C. M. Wesson. Read before Am. Found. Assn. 2500 w. Fndry—Oct., 1917. Serial, 1st part. (Special No.) Why certain specifications are unusually severe.

The Effects of Seasoning on Gray Iron Castings (81654 A). L. M. Sherwin. Read before Am. Found. Assn. Ills. 2500 w. Fndry—Oct., 1917. (Special No.) Results of tests on cast-iron surface plates and straight edges subjected to varying treatment.

**Cementation**

The Cementation of Iron and Steel (77740 A). Ernest Edgar Thum. Ills. 850 w. Met & Chem Eng—April 1, 1917. Extended review of recent book by Dr. Frederico Giolitti, on this subject.

**Chains**

Heat Treatment of Wrought-Iron Chain Cable (76990 A). W. W. Webster and E. L. Patch. (Abstract.) Ills. 6000 w. A S M E, Jl—March, 1917. Experimental study of this subject, tests, and conclusions.

**Cleaning**

Soaps, Cleaning Compounds and Polishing Compositions (80619). F. A. Shepherd. 4000 w. Brs Wld—Aug., 1917. Hints for platers.

**Clocks**

Designing and Constructing a Clock (81496 A). Guy H. Gardner. Ills. 1200 w. Machy—Oct., 1917. Details of work.

**Core Boxes**

Gang Core Boxes Lessen Foundry Costs (80652). J. V. Hunter. Ills. 2800 w. Am Mach—Aug. 23, 1917. Details of various forms of the solid and split types.

Application and Use of the Booking Type of Core Box (81041). J. V. Hunter. Ills. 1500 w. Am Mach—Sept. 13, 1917. Methods for applying the principle of the common type of molding machine to the production of cores.

**Cores**

How Cores for Motor Car Castings Are Made (79657). Ills. 3500 w. Fndry—July, 1917. Methods employed by the Ferro Machine & Foundry Co.

Electric Oven Used For Baking Cores (81280 A). Ills. 1200 w. Iron Age—Sept. 20, 1917. Installation in plant of Willys-Overland Co. Cores baked while passing through oven on continuous conveyor.

**Countersinking**

Countersinking (75454 A). J. Stormonth. Ills. 1000 w. Mech Wld—Dec. 8, 1916. Best practice.

**Crucibles**

The Safe Handling of Crucibles in the Foundry (80266). 3000 w. Fndry—Aug., 1917. Careful treatment prolongs the life and promotes safety.

**Cupolas**

The Importance of Proper Cupola Blast (80510 A). Walter J. May. 1200 w. Mech Wld—Aug. 3, 1917. The importance of the blast in melting iron. Suggestions.

**Cutting**

Cutting-off Machines (75136 A). Ills. 1000 w. Engng—Nov. 17, 1916. The McMeans and Bosler cutting-off machines.

The Commencement of Cuts (75130 A). Fred Horner. Ills. 1400 w. Mech Wld—Nov. 24, 1916. Suggestions.

**Cutting Tools**

The Cutting Tool and the Curling Chip (78951 A). Frank Richards. Ills. 2500 w. Machy—June, 1917. Analysis of cutting action in relation to lubrication.

**Cylinders**

The Strength of Thick Cylinders (76701 A). W. C. Popplewell. Ills. 1800 w. Mech Wld—Feb. 2, 1917. Serial, 1st part. Relation between pressure, size, and resulting stresses.

Thick Cast Cylinders (76436). P. M. Gallo. Chart. 700 w. Prac Eng, Chi—Feb. 1, 1917. Design and development of formula.

**Die-Casting**

The Evolution of the Die-Casting Process (79072). Charles W. Pack. Ills. Read before the Inst. of Metals. 4500 w. Fndry—June, 1917 Serial, 1st part. Discussion of early practice underlying the development of the die cast part.

**Die-Forging**

Die-Forging Troubles (77068 A). Joseph Horner. Ills. 5500 w. Machy—March, 1917. Serial, 1st part. Field for die-forgings and methods of avoiding common troubles.

**Dies**

Mechanical Die-Sinking (74275 A). Edward K. Hammond. Ills. 3500 w. Machy—Nov., 1916. The advantages of the reducing machine explained.

Dies For Making Fancy Jewelry (80417). O. E. McLaughlin. Ills. 1500 w. Am Mach—Aug 9, 1917. Die-making and methods of handling the work.

**Drafting**

The Observations of a Draftsman (74994 B). Filupo Brunelleschi. 2500 w. Brkbldr—Nov., 1916. Criticism from the employee's standpoint.

Photography in the Drafting Room (76768). H. P. Palmer. Ills. 800 w. Cl Age—Feb. 17, 1917. Its advantages. Photostat described.

Perspective Sketching From Orthographic Views (81461). Arthur B. Babbitt. Ills. 2500 w. Am Mach—Sept. 27, 1917. Prepared especially for draftsmen.

The Drafting-Room Apprentice (80936). Charles M. Horton. Ills. 2500 w. Am Mach—Sept. 6, 1917. First of a series of articles for draftsmen and designers. Discusses methods of training draftsmen, and the advantages of the apprentice system.

Specially Ruled Sheets Have Wide Use in Drafting Room (81982). Richard T. Dana. Ills. 2000 w. Eng News-Rec—Oct. 25, 1917. Printed from wax plates, little trouble is experienced with shrinkage.

**Drawing Office**

Notes on Drawing-Office Work (78385 A). 2000 w. Mech Wld—April 13, 1917. Notes applying to general practice in offices dealing with machinery installations in ocean-going vessels.

**Drawings**

The Locomotive Drawing-Office (77008 A). 800 w. Mech Wld—Feb. 16, 1917. Serial, 1st part. Outlines methods of procedure.

**Drilling**

Drilling Deep Holes (75283 A). G. Walters. Ills. 700 w. Mech Wld—Dec. 1, 1916. Ordnance work and methods.

Precision Drilling Machine (81690). C. E. Davies. Ills. 2500 w. Am Mach—Oct. 11, 1917. Machine built and used at the Smith Premier Works.

**Drills**

Drill Bits and Drill Steel for Metal Mining (80202). George H. Gilman. Ills. 2000 w. Eng & Min Jl—July 28, 1917. Explanations and suggestions for sharpening and tempering drill bits.

**Dust Collecting**

Dust Collecting by Wholesale (77357). John L. Aldese. Ills. 2000 w. Com Air Mag—March, 1917. Interesting installation at Oneida, N. Y.

**Electric Furnace**

The Electric Furnace in the Steel Casting Plant (79070). R. F. Flinterman. 2500 w. Fndry—June, 1917. Details of practice in the production of parts averaging about 20 pounds.

**Enamelling**

Electric Ovens in an Automobile Plant (75021 A). Ills. 1200 w. Iron Age—Nov. 30, 1916. New type with conveyor equipment for baking enamels.

**Equipment in Concrete**

La Fixation Des Chaises Et Des Consoles (80022 B). C. Lemaire. Ills. 4000 w. Gen Civ—June 30, 1917. Hangers, brackets and other devices for supporting equipment in concrete buildings.

Installing Equipment in Concrete Buildings (80153 A). H. Colin Campbell. Ills. 2000 w. Ind Man—Aug., 1917. Methods of securing pipes, wiring, trolley rails and heavy machinery to ceilings and walls.

**Explosions**

Industrial Oxygen Explosions (80252 A). Edward K. Hammond. Ills. 2500 w. Machy—Aug., 1917. Causes of rupture of storage cylinders used in welding and cutting operations.

**Extrusion Press**

Metal Extrusion (79662 A). F. G. Schranz. Ills. 800 w. Machy—July, 1917. Details of the hydraulic extrusion press and its working.

**Facings**

Foundry Facings (79385 A). H. Winterton. 2000 w. Mech Wld—June 8, 1917. Read before British Found Assn. Considers coal dust, blackings and steel refractories.

**Factory Metallurgists**

Work of the Factory Metallurgist (81326). 3500 w. Auto—Sept. 20, 1917. Points made in R. H. Sherry's paper before the Detroit section of the S. A. E. Problems of the chemical and metallurgical departments of automobile factories.

**Filing**

La Lime (78292 B). Ills. 4400 w. Gen Civ—Mar. 31, 1917. Analytical study, to determine a workman's effort in operating a file on given classes of work.

**Finishes**

The Coloring and Coating of Metals (80620). W. A. Ehlers. Ills. 5500 w. Brs Wld—Aug., 1917. Processes for producing surface finishes on metals.

Electric Japanning (80513 B). C. D. Carlson, with discussion. 5400 w. Cleve Eng Soc, Jl—July, 1917. Reviews development and describes operations.

**Fits**

Force and Shrink Fits (77801 A). Sanford A. Moss. 7000 w. Gen Elec Rev —April, 1917. Complete mathematical theory.

**Fixtures**

Work-Holding Fixtures for Blanchard Surface Grinder (78957 A). Douglas T. Hamilton. Ills. 2500 w. Machy—June, 1917. Use of magnetic chucks and fixtures.

Attachment For Cutting Cams and Profiles (81248). William C. Roemer. Ills. 1500 w. Am Mach—Sept. 20, 1917. A comparatively simple attachment is described and a method of laying out various outlines.

Work-Holding Arbors and Fixtures (81497 A). Douglas T. Hamilton. Ills. 3500 w. Machy—Oct., 1917. Devices for holding and clamping work on the Fellows gear shaper.

**Fluxing**

Fluxing Foundry Metals (81175 A). Walter J. May. 2500 w. Mech Wld—Aug. 31, 1917. Ways for using the flux for iron, brass, copper and zinc alloys, scrap, etc.

**Forge Shops**

The Panama Canal Forge Shops (80934). Frank A. Stanley. Ills. 1200 w. Am Mach—Sept. 6, 1917. Features of tropical construction and equipment.

**Forgings**

Inspecting Forgings for High-Explosive Shells (78439 A). F. E. Merriam. 1500 w. Machy—May, 1917. Methods described.

Forging Versus Heat Treatment of Steel (78831 A). D. K. Bullens. Ills. 3000 w. Iron Age—May 24, 1917. Improper initial heating responsible for difficulties which careful heat treating cannot rectify.

Forging Rifle Barrels (79950). Fred H. Colvin. Ills. 1000 w. Am Mach—July 19, 1917. Details of a special plant.

Forging Shells at Curtis Plant, St. Louis (79708 A). Ills. 4000 w. Iron Age—July 5, 1917. Free use of patented process offered during the war.

**Forming**

Manufacturing Operations on a Combination Sugar Bowl (80937). Ills. 600 w. Am Mach—Sept. 6, 1917. Drawing, forming and trimming operations.

**Forming Tools**

Graphical Solution for Circular Forming Tools (80557). G. E. Zugelter. Ills. 1000 w. Am Mach—Aug. 16, 1917. Graphical method of obtaining various cutting diameters of circular forming tools.

**Foundries**

A New Iron and Steel Roll Foundry (75115 A). Ills. 1500 w. Iron Age—Dec. 7, 1916. Recent additions to a plant in Birdsboro, Pa.

Racine Electric Steel Foundry Completed (75116 A). Ills. 1000 w. Iron Age—Dec. 7, 1916. Detailed description.

Nash Motors Company Foundry at Kenosha (75727 D). Oliver J. Abell. Ills. 2500 w. Iron Age—Jan. 4, 1917. Special No. Interesting features.

The Foundry Today (77612 A). Benjamin D. Fuller, with discussion. 4000 w. Clev Eng Soc, Jl—March, 1917. New developments.

The Foundry To-day (78186). Benjamin D. Fuller. 500 w. Brs Wld—April, 1917. Changes made and their advantages.

The Foundry Behind the Automobile (79069). Ill. 4000 w. Fndry—June, 1917. Foundry of the Buick Motor Co., Flint, Mich., which will melt 240 tons of iron daily. Careful planning and efficient results.

A Notable Small-Tonnage Foundry (79099 A). Ills. 1600 w. Iron Age—June 7, 1917. Construction and operating methods of a new foundry at Cranston, R. I.

Metallurgical Processes in the Foundry (79646 A). Alexander E. Outerbridge, Jr. Ills. 5000 w. Met & Chem Eng—July 1, 1917. Use of ferromanganese, ferro-silicon, chills and iron molds. Read before the Philadelphia Found. Assn.

Stove Plate Foundry of a Modern Design (79972 A). Ills. 2000 w. Iron Age —July 19, 1917. Interesting type of building in Cleveland, O.

The Cleveland Stove Foundry for Maximum Output (80264). Ills. 1800 w. Fndry—Aug., 1917. Arrangements in this new plant.

The Foundry To-Day (80432 A). Benjamin D. Fuller. 2000 w. Mech Wld—July 27, 1917. Serial, 1st part. Recent changes in methods, equipment, etc.

The Panama Canal Foundry at Balboa (80282). Frank A. Stanley. Ills. 1000 w. Am Mach—Aug. 2, 1917. Details of foundry for handling repairs.

Foundry Built For Economical Production (81282 A). Ills. 2200 w. Iron Age —Sept. 20, 1917. Features of malleable plant of Timken Detroit Axle Co.

Foundry Troubles (81176 A). T. W. Aitken. Read before British Found. Assn. 2500 w. Mech Wld—Aug. 31, 1917. Causes and remedies.

Some Latter-Day Problems of the Foundry (21283 A). Dr. Richard Moldenke. 3000 w. Iron Age—Sept. 20, 1917. Partly due to war conditions.

How Japan Turned Its Gardens Into Foundries (80932). "Hi" Sibley. 1800 w. Am Mach—Sept. 6, 1917. Details of back-yard foundries in Japan.

New Foundries in New England (81279 A). W. E. Freeland. Ills. 2500 w. Iron Age—Sept. 20, 1917. Details of plants.

Plant for Large Output of Die Castings (81876 A). Ills. 1500 w. Iron Age—Oct. 18, 1917. Works in Toledo. Arrangements to reduce production costs.

**Foundry Industry**

How the Foundry Industry Has Prepared for War (78429). 3000 w. Fndry—May, 1917. Shows foundries to be well prepared.

**Foundry Practice**

Some Experiences in Steel-Foundry Practice (80099 A). T. Brown. Read before British Found. Assn. Ills. 1700 w. Mech Wld—July 13, 1917. Serial, 1st part. Causes of castings pulling, etc.

**Foundry Work**

New Converter Plant for Economical Operation (77786). Ills. 2200 w. Fndry—April, 1917. Features of the organization, equipment, and methods of the Blackwood steel foundry at Springfield, O.

The American Foundry in a Time of War (77785). Edgar Allen Custer, Jr. Ills. 3500 w. Fndry—April, 1917. Lessons in shell-making from the experience of French foundrymen.

Minimizing Lost Motion in Foundry (81452 A). Ills. 1400 w. Iron Age—Sept. 27, 1917. Keeping materials flowing from raw to finished products.

Overcoming Difficulties Due to Metal and Design (81063 A). F. Andrew. Ills. 2000 w. Mech Wld—Aug. 24, 1917. From *Found Trd Jl.* Methods used for difficult castings.

**Frames**

Locomotive Frame Work (81901). Frank A. Stanley. Ills. 800 w. Am Mach—Oct. 18, 1917. Describes handling of broken side frame.

**Furnace Design**

Principles of Furnace Design (80512 B). A. D. Williams, with discussion. Ills. 7000 w. Cleve Eng Soc, Jl—July, 1917. Study of the action of flame.

**Furnaces**

The Fuel Oil Furnace (75417). J. F. Springer. Ills. 4000 w. Brs Wld—Dec., 1916. Analysis and methods of burning fuel oil; with an approved type of furnace.

The "Wellman" Furnaces (77652 A). Ills. 500 w. Engng—March 9, 1917. Furances for heating shell billets, and ingots.

Oil-Fuel Furnaces for Brass (78848 A). Joseph Horner. Ills. 1200 w. Mech Wld—May 11, 1917. Serial, 1st part. Detailed description.

A Carbon Tube Furnace For Testing the Softening Points and Compressive Strengths of Refractories (80522 N). Ezer Griffiths and Edgar C. Griffiths. Ills. 30 pp. Faraday Soc. Trans—June, 1917. References and discussions.

The Thermal Conductivity of Materials Employed in Furnace Construction (80521 N). Ezer Griffiths. Ills. 14 pp. Faraday Soc, Trans—June, 1917. Experimental work; methods and results.

**Furnace Test**

Test of Recuperative Gas Oven Furnace (78450 A). W. C. Buell, Jr. Ills. 1500 w. Iron Age—May 3, 1917. Economies from preheating the air supply.

**Fuses**

Manufacturing Parts of Type 80 Time Fuses (75088 A). Donald Baker. Ills. 3000 w. Machy—Dec., 1916. Machining operations on top and bottom rings; design of special tools.

**Galvanizing**

La Galvanisation, L'Étamage Et Le Plombage Du Fer (78275 B). 2000 w. Gen Civ—Mar. 17, 1917. Processes for galvanizing and tinning iron wire.

Surface Combustion Used in Galvanizing (77816 A). William J. Harris, Jr. Ills. 800 w. Iron Age—April 5, 1917. Substitution of gas-fired bath for one employing coke.

Surface Combustion Applied to Galvanizing (79360). William J. Harris, Jr. 100 w. Brs Wld—June, 1917. Describes installation at the Chapman Steel Co., Indianapolis, Ind.

Galvanizing Buoys for the U. S. Government (79974). C. W. Cunningham. Ills. 1000 w. Brs Wld—July, 1917. Process and apparatus employed.

**Gear Planer**

Mesta Herringbone Gear Planer (74287 A). Ills. 2000 w. Machy. Nov., 1916. Machine for cutting heavy gears and pinions.

**Gears**

The Selection of Gearing (80204). W. H. Phillips. Ills. 2500 w. Eng & Min Jl—July 28, 1917. Heat-treated carbon steel was developed to give required results.

**Gauges**

Precision Gauge Making (77007 A). Gustave A. Remacle. Ills. 1200 w. Mech Wld—Feb. 16, 1917. Details of operations.

The Manufacture of Gages (77018 A). Ills. 1500 w. Iron Age—March 1, 1917. Methods used abroad for their rapid production for making war material.

**Glass Machine**

The Window-Glass Machine (79731 A). Robert Linton. Ills. 4000 w. Engng—June 15, 1917. Serial, 1st part. Explains difficulties involved and the development of apparatus to do the work mechanically.

**Grinding**

Grinding Wheels and Grinding Machines (76348 A). C. W. Blakeslee. Ills. 3500 w. Ind Man—Feb., 1917. Typical tools used under various conditions.

Grinding High-Speed Tool Steels (76800 A). C. E. Gillett, in *Grits and Grinds*. 1000 w. Mech Wld—Feb. 9, 1917. Difficulties and remedies.

Gage Grinding (76443 A). Charles F. Schlagel. Ills. 1000 w. Machy—Feb., 1917. Suggestions.

Workshop Precision Grinding (77699 A). H. H. Asbridge. From paper before the Manchester Assn. of Engrs. 2500 w. Mech Wld—March 16, 1917. Serial, 1st part. Manufacturing applications; principally cylindrical external and internal, and surface grinding. Methods and comment.

Little-Known Facts About Grinding (78200 A). Howard W. Dunbar. 1500 w. Mech Wld—April 6, 1917. List of things causing chatter marks.

Grinding and Milling Work (79285 A). Ills. 2500 w. Ry Mech Engr—June, 1917. Means for reducing cost and increasing output.

Dont's for the Grinding-Machine Operator (81173 A). Howard W. Dunbar in *Grits and Grinds*. 700 w. Mech Wld—Aug. 31, 1917. Thirty-five cautions.

Grinding Machines (80969 A). Howard W. Dunbar. 900 w. Mech Wld—Aug. 17, 1917. From *Grits and Grinds*. Types of grinding machines and their merits.

**Grinding Wheels**

Diamonds for Dressing Grinding Wheels (81493 A). G. T. Linting. Ills. 2000 w. Machy—Oct., 1917. Factors governing the value of bort diamonds and methods of setting and using them.

**Gun Erosion**

Erosion of Guns—The Hardening of the Surface (78135 D). 6000 w. A I M E, Bul—April, 1917. Discussion of Henry Fay's paper.

**Guns**

La Fabrication Des Canons (78882 B). Ills. 3900 w. La Nat—May 12, 1917. Methods of fabrication, etc., of large caliber guns at the Creusot and other works.

La Fabrication Des Canons (80024 B). Ills. 2500 w. La Nat—June 16, 1917. Machining and finishing operations on large artillery pieces in French gun shops.

The Vickers Machine Gun Model of 1915 (80648). Ills. 7000 w. Am Mach—Aug. 23, 1917. Detailed description.

**Gun Sight**

The Panoramic Sight (80281). W. L. Ohmstead. Ills. 2500 w. Am Mach—Aug 2, 1917. Serial, 1st part. Outline of the construction and operation, and manufacturing requirements of the panoramic gun sight.

**Hand Guards**

Operations on the Hand Guard (79905). Ills. 800 w. Am Mach—July 12, 1917. Serial, 1st part. No. 79905.

**Hardening**

Some Notes on Hardening Screw Gauges (75979 A). J. H. Lavender. Ills. 1200 w. Engng—Dec. 29, 1916. Particulars obtained from experimental work.

The Hardening and Annealing of Metals (75870 N.) Thomas Turner, with discussion. 4500 w. Chem, Met & Min Soc of S Af, Jl—Oct., 1916. Methods employed.

The Hardening of Steel (81092 N). W. Latham Burton. Ills. 2500 w. Eng & Min Rev—Aug. 6, 1917. Read before the S. Aust. Inst. of Engrs. Directions, etc.

**Heat Treatment**

Notes on the Heat Treatment of High-Speed Steel Tools (76191 D). A. E. Bellis and T. W. Hardy. Ills. 1000 w. A I M E, Bul—Jan., 1917. Experiments in which metallographic means were used to determine the correct hardening temperatures.

The Heat Treatment of Metals (76960 A). W. A. Ehlers. 4500 w. Ind Man—March, 1917. Serial, 1st part. Fuels and their heat utilization in furnaces.

Notes on the Heat Treatment of High-Speed Steel Tools (77443 D). Ills. 1500 w. A I M E, Bul—March, 1917. Paper by A. E. Bellis and T. W. Hardy is discussed.

The Heat Treatment of Metals (77616 A). W. A. Ehlers. Ills. 5500 w. Ind Man—April, 1917. Second paper of a series. Discusses thermal operations of both low and high carbon steel.

Efffect of Time in Reheating Hardened Steel below the Critical Range (78133 D). 4000 w. A I M E, Bul—April, 1917. Discussion of the paper of Carl R. Hayward and S. S. Raymond.

I. Heat Treatment of Steel Forgings. H. H. Ashdown. II. The Heat Treatment of Large Forgings. William Beardmore (78051 A). Ills. 10500 w. Engng—March 23, 1917. Two papers read before the Instn. of Mech. Engrs., discussed together.

Notes on the Heat Treatment of High-Speed Steel Tools (78132 D). 2000 w.

A I M E, Bul—April, 1917. Discussion of paper of A. E. Bellis and T. W. Hardy.

Heat Treatment of Forgings (78287). 1200 w. Times Eng Supp—Mar. 30, 1917. Workshop limitations; large forgings; science and practice.

The Heat Treatment of Metals (78894 A). W. A. Ehlers. Ills. 5000 w. Ind Man—June, 1917. Third article of a serial dealing with metal coloring and coating.

**Hobs**

Flutes in a Hob (78958 A). John Edgar. Ills. 3500 w. Machy—June, 1917. Relation of flutes to results obtained.

**Hot Boxes**

What Foundrymen Can Do to Prevent Hot Boxes (77093). Russell R. Clarke. Ills. 4000 w. Fndry—March, 1917. Careful attention to journal bearings in the foundry.

**Industry**

Honor in Industrial Service (78883 A). 2500 w. Ind Man—June, 1917. Editorial on the enormous task confronting industry. Organization necessary.

**Inspection**

The Functions of an Inspection Department (81174 A). C. Turtle. Read before Jun. Instn. Engrs. 3000 w. Mech Wld—Aug. 31, 1917. The importance of inspection in works manufacturing in quantity and the reasons.

**Japanese Plant**

A Million Dollar Japanese Machine Tool Plant (80650). "Hi" Sibley. Ills. 1600 w. Am Mach—Aug. 23, 1917. Development and description of the Ikegai Iron Works, Ltd., of Tokyo.

**Jigs**

Jigs and Fixtures (75453 A). E. Gregory. Read before Keighley Assn. of Engrs. 800 w. Mech Wld—Dec. 8, 1916. Serial, 1st part. Considerations of design.

Jigs and Fixtures in Munition Work (80034). 3000 w. Times Eng Supp—June 29, 1917. Advantages, extent of their use, etc.

Jigs and Fixtures for Milling and Assembling (81495 A). S. Helweg. Ills. 700 w. Machy—Oct., 1917. Features of design and some special forms.

**Labor Saving**

Labor Saving Devices in the Machine Shop (74950 A). Albert A. Dowd. Ills. 4000 w. Ind Man—Dec., 1916. Recently designed machines and their applications.

**Lapping**

Lapping Hardened Steel Surfaces (80429 A). Earl E. Cline, in *Am. Mach.* 2500 w. Mech Wld—July 29, 1917. Methods described.

**Lathe Equipment**

Gridley Turret Lathe Equipment (80250 A). Douglas T. Hamilton. Ills. 2500 w. Machy—Aug., 1917. Chucks, forming and cutting off tools, drill-holders, etc.

**Lathes**

Draaibankenfabricage in Nederland (74856 B). H. J. J. Esmeijer. Ills. 1600 w. Ingr—Oct. 7, 1916. Description of lathes built in Holland.

Sliding, Surfacing and Screw-Cutting Lathes (74572 A). Ills. 500 w. Engng—Oct. 27, 1916. Detailed description.

Erecting and Starting a New Engine Lathe (75087). Ills. 1200 w. Machy—Dec., 1916. Information from bulletin issued by the Lodge & Shipley Machine Tool Co.

The Hare Boring Turret Lathe (75398 A). Ills. 500 w. Engng—Dec. 1, 1916. Designed especially to bore shells.

Two New Lathes (78215 A). Ills. 900 w. Engr—March 30, 1917. Details of a machine for turning crank pins, and of a motor-driven lathe.

Description of Sellers' New Design of High Power Wheel Turning Lathe (78440 A). Ills. 1200 w. Ry & Loco Eng—May, 1917. Features of interest.

Lathe Centres (80386 A). Ills. 1000 w. Mech Wld—July 20, 1917. Centering work, its troubles and remedies.

Building a Precision Lathe (81043). M. E. Hoag. Ills. 1200 w. Am Mach—Sept. 13, 1917. Methods used by one of the large makers.

21-In. Hole Crank-Forming Lathe (81855 A). Ills. 800 w. Engng—Sept. 28, 1917. A single-pin forming machine. Special features described.

**Lathe Tools**

Multiple Tools for the Lathe (76446 A). Henry M. Wood. Ills. 4000 w. Machy—Feb., 1917. Turning tools that save labor and improve production.

**Machine Operations**

Machining Operations on a Stapling Machine (80137). Ills. 1000 w. Am Mach—July 26, 1917. Operations in making a stapling machine.

Machining Car Wheels and Axles (80422 A). 2200 w. Ry Mech Engr—Aug., 1917. Methods followed by a large railroad showing benefits derived by greater precision.

**Machine Shops**

Machine Shop Session (79673 A). 9500 w. A S M E, Jl—July, 1917. Discussion of three papers, by A. L. DeLeeuw, Fred G. Kent, and Charles Meier.

Munitions Sessions (79677 A). 13 pp. A S M E, Jl—July, 1917. Discussions of munitions papers and related topics.

**Machine Tools**

Planing Machine and Boring and Turning Mill (74761 A). Ills. 600 w. Engng—Nov. 16, 1916. Detailed descriptions.

Increasing Use of Secondary Machine Tools (75725 D). C. A. Tupper. 3500 w. Iron Age—Jan. 4, 1917. Special No. War time development.

Cartridge Case Making Machines (76381 A). Ills. 500 w. Engng—Jan. 12, 1917. Detailed description.

Recent Machine Tools (76699 A). Ills. 4000 w. Mech Wld—Jan. 26, 1917. Detailed descriptions.

Probable Requirements in Machine Tools (77760 A). A. M. Sosa. Ills. 3000 w. A S M E, Jl—April, 1917. Discussion of means for their fulfillment, describing an automatic tool-feeding mechanism.

Munition Work and Machine Tools (78864). 3300 w. Times Eng Sup—April 27, 1917. Recent machine tools used in British munition works.

A System for Rejuvenating Machine Tools (79217 A). Ills. 1500 w. Iron Age—June 14, 1917. Outlines methods in a large Chicago plant.

Power Tests of Machine Tools (79282 A). C. H. Crawford. Ills. 1000 w. Ry Mech Engr—June, 1917. Determination of average and maximum driving power and power wasted by friction in large tools.

Selection of Machine Tools (79281 A). Willard Doud. Ills. 2000 w. Ry Mech Engr—June, 1917. Method of submitting proposals, etc.

**Malleable Iron**

Casting and Machining Malleable Iron Parts (74284 A). H. W. Johnson. Ills. 1800 w. Machy—Nov., 1916. Difficulties and means of overcoming them.

**Marking**

Graduating, Engraving and Etching (80847 A). Franklin D. Jones and Edward K. Hammond. Ills. 17 pp. Machy—Sept., 1917. Information concerning these three methods of marking, and the kind of work for which each is adapted.

**Mauser Factories**

Les Usines Mauser D'Oberndorf (75604 B). J. Boyer. Ills. 1300 w. La Nat—Dec. 2, 1916. Description of the works making Mauser rifles, and details of product.

**Metal Coloring**

See Heat Treatment.

**Metal Furniture**

Production of Metal Furniture (81498 A). K. George Selander. Ills. 2500 w. Machy—Oct., 1917. Planning, estimating, designing, checking, and manufacturing.

**Metallography**

Metallography from a Practical Point of View as Applied Especially to Bronze Castings (76808). George F. Comstock. Ills. 5000 w. Brs Wld—Feb., 1917. Serial, 1st part. Preparing specimens for examination; different methods, etc.

**Metal Melting**

Coal-Gas as a Fuel for Melting Non-Ferrons Alloys (77944 N). George Bernard Brook. Ills. 14 pp. Inst Met—March 21, 1917. Describes furnace used and gives results of tests.

Metal Melting (78286). 2300 w. Times Eng Supp—Mar. 30, 1917. Advantages of different fuels for brass, copper, nickel and aluminum.

Ideals and Limitations in the Melting of Non-Ferrous Metals (77948 N). Carl Hering. 8 pp. Inst Met—March 21, 1917. Ideals and limitations which should be borne in mind in endeavoring to improve methods.

Metal Melting (77946 N). H. M. Thornton and Harold Hartley. 18 pp. Inst. Met—March 21, 1917. Deals only with a furnace intended for melting the metals of higher melting point from brass upwards.

Metal Melting as Practiced at the Royal Mint (77943 N). W. J. Hocking. Ills. 21 pp. Inst Met—March 21, 1917. Detailed description of the work.

Metal Melting by Means of High-Pressure Gas (77945 N). C. M. Walter. Ills. 28 pp. Inst Met—March 21, 1917. Types of furnaces used.

Metal Melting in a Simple Crude-Oil Furnace (77949 N). H. S. Primrose. Ills. 1000 w. Inst Met—March 21, 1917. Construction and advantages with results.

On an Electric Resistance Furnace for Melting in Crucibles (77947 N). H. C. Greenwood and R. S. Hutton. Ills. 900 w. Inst Met—March 21, 1917. Experience of gas melting so far as nickel silver is concerned, and with an electric furnace.

**Metal Working**

Mechanical Deformations in Metals (77065 A). B. D. Ballantine. Ills. 1400 w. Machy—March, 1917. Features in connection with the cold-working of metals.

Making Gray Iron Art Work (77087). E. C. Kreutzberg. Ills. 1800 w. Fndry March, 1917. How ornamental castings are made.

**Milling Cutters**

Alignment Chart for Milling Cutters (79949). A. Lewis Jenkins. 2000 w. Am Mach—July 19, 1917. For figuring speeds, feeds and power of milling cutters.

A Point in the Fluting of Reamers and Millling Cutters (79725 A). George W. Burley. Ills. 1000 w. Mech Wld—June 22, 1917. Serial, 1st part. Describes method used in forming a 75° flute or groove with a 60° fluting cutter.

**Milling Machine**

Slot-Milling Machine for Turbo-Generators (79585 A). Ills. & Plates. 500 w. Engng—June 8, 1917. Details of machines built in Philadelphia for the General Electric Co.

**Molding**

How Heavy Ammonia Stills Are Molded (77092). Ills. 2000 w. Fndry—March, 1917. A novel method.

Improved Method for Molding Lathe Beds (77301 A). Paul R. Ramp. Ills. 700 w. Iron Age—March 15, 1917. Use of cheek bars eliminated.

Molding Wheels and Sheaves With Steel Spokes (77090). R. H. Palmer. Ills. 1500 w. Fndry—March, 1917. How to arrange mold and place gates.

How Walker Process Reduces Ingot Mold Costs (77789). Ills. 2500 w. Fndry—April, 1917. Novel method of molding.

The Influence of Occluded Gases in Cast Metal (77788). J. E. Fletcher. Ills. 4500 w. Fndry—April, 1917. Action of metal in cooling molds and the effect of gases.

Sensible Flask Equipment for Machine Molding (78430). Paul R. Ramp. Ills. 1400 w. Fndry—May, 1917. Often more economical to alter the design of the pattern to suit the flask.

A Difficult Bronze Casting Molding Job (79071). Charles Vickers. Ills. 1500 w. Fndry—June, 1917. Details of method.

Advantages of Hand and Power Machine Molding (79660). R. Carrick. 8000 w. Fndry—July, 1917. Outlines advantages of each type.

**Molding Machine**

The Development of the Molding Machine (79338). Ills. 3800 w. Rev—June, 1917. Types, equipment and method of operation.

Improving a Molding Machine (80853 A). S. W. Palmer. Ills. 1000 w. Machy—Sept., 1917. Object was to increase the pressure on the surface of the mold.

**Multi-Machining**

Multi-Machining in Production Quantities (79668 A). A. E. Carle. Ills. 1500 w. Machy—July, 1917. Jigging the work on multiple-spindle drilling machines.

**Munitions**

Munitions Manufacture (78884 A). 6500 w. Ind Man—June, 1917. Editorial on the complications and difficulties of munitions making.

The Successful Production of Large Shells (78888 A). L. P. Alford. Ills. 3000 w. Ind Man—June, 1917. How a plant was organized, built and equipped for turning out 9.2-inch shells.

Munitions Papers (78463 A). 18 pp. A S M E, Jl—May, 1917. Abstracts of papers by F. A. Waldron, A. L. Humphrey, H. L. Coe, H. V. Haight, L. I. Yeomans, J E. Otterson, C B. Nolte, A. W. Erdman, F O. Wells, and E. T. Walsh, with bibliography.

The Manufacture of Munitions and the Permanent Assets to Canadian Industry Resulting Therefrom (78625). David Carnegie. 2000 w. Can Engr—May 10, 1917. Outlines manner in which manufacturers have responded to call for munitions.

Equipment for Expediting Shell-Forging (80138 A). Ills. 3000 w. Iron Age—July 26, 1917. How a company doubled its plant capacity for making rolled and cast-steel shells.

Machines and Appliances for Munition Making (79730 A). 1600 w. Engng—June 15, 1917. Illustrations of special machines and crane equipment recently developed.

Devices to Facilitate Shell Machining (80261 A). Enos Moore. Ills. 1100 w. Iron Age—Aug. 2, 1917. Tools for centering forgings and for lathe work.

**Munitions Factories**

The Royal Visit to Munition Factories (79311 A). Ills. & Plates. 2200 w. Engng—May 25, 1917. Details of the factories visited.

**Nitrating Kettles**

Some Notes on Nitrating Kettles With an Example of Acetylation Apparatus (81313 A). Frederick Pope. Ills. 2000 w. Met & Chem Eng—Sept. 15, 1917. Forms of such kettles and of agitators used, and an example of acetylation apparatus.

**Operating Expense**

Keeping Down Operating Expense in a Small Gray Iron Foundry (79067. Ills. 2500 w. Fndry—June, 1917. How it is done in an Ohio shop.

**Overhauling**

Efficiency of Machines and Overhauling (81064 A). 3000 w. Mech Wld—Aug. 24, 1917. Explains the manner in which friction affects the working of machines, and how efficiency varies with the load on the resistance.

**Paint Spraying**

The Airostyle Paint-Spraying Plant (80976 A). Ills. 1800 w. Engng—Aug. 17, 1917. Detailed description.

**Patternmaking**

Skeleton Patternmaking (74568 A). James Edgar. Ills. 1600 w. Mech Wld—Nov. 3, 1916. Serial, 1st part. Advantages and disadvantages for certain classes of work.

**Patterns**

Pattern Match Plates (81460). J. V. Hunter. Ills. 4000 w. Am Mach—Sept. 27, 1917. Examples shown and discussed.

Pattern Work For Turbine Control Valve (81320 A). James Edgar. Ills. 1800 w. Mech Wld—Sept. 7, 1917. Details of methods used.

**Pattern Work**

The Fundamental Principles of Plate Mounting (77787). R. R. Clarke. 2500 w. Fndry—April, 1917. Methods of determining the position of patterns in various kinds of work.

**Pipe**

Cast-Iron Pipe Manufacture in the South (74783 A). Y. A. Dyer. Ills. 1500 w. Iron Age—Nov. 23, 1916. Innovations that have improved production.

Manufacture of Welded Steel Pipe (78758 A). Cornelius F. Roland. Ills. 2500 w. Sib Jl Eng—May, 1917. History of pipe; processes employed in making modern pipe.

**Pipe Casting**

La Fabrication des Tuyaux de Fonte (76236 B). Ills. 1900 w. Gen Civ—Dec. 23, 1916. Molding machines for pipe casting described.

**Pipe Repairs**

Leaking Lap-Welded Steel Pipe Repaired and Tested by Bulhead Sections in the Field (78082). Charles A. Lee. Ills. 2500 w. Eng News-Rec—April 12, 1917. Faulty welds made tight by heavy riveted butt-straps.

**Pistons**

Locomotive Piston and Crosshead Work (80558). Frank A. Stanley. Ills. 900 w. Am Mach—Aug. 16, 1917. Operations on pistons, crosshead and guides.

**Planing Machines**

Heavy Edge-Planing Machines (79314 A). Ills. 800 w. Engng—June 1, 1917. Detailed description.

**Planning**

See same heading under INDUSTRIAL MANAGEMENT, *Management*.

**Plant Arrangement**

Plant Arrangement That Permits Continuous Production Flow (75685). H. S. Stewart. Ills. 1200 w. Elec Wld—Dec. 30, 1916. Arrangements in a Chicago plant.

Layout of Machine Tools For a Large Light Manufacturing Plant (80332 A). David J. Mattock. Ills. 2000 w. E Cb Phila, Pro—Aug., 1917. Outlines procedure, discussing problems.

**Plating Barrels**

The Fully Submerged Plating Barrel (81315). James Steelman. Ills. 2500 w. Brs Wld—Sept., 1917. The construction, mode of operation, and claims.

**Pneumatic Tools**

Development of Pneumatic Hand Tools (80135). Glenn B. Harris. 5000 w. Am Mach—July 26, 1917. Tools derived from a simple dental plugger.

**Pressed Steel Works**

Expansion of the Gier Pressed Steel Co. (80646 A). Charles Lundberg. Ills. 1500 w. Iron Age—Aug. 23, 1917. Development and description of an up-to-date plant in Lansing, Mich.

**Press Tools**

Snap Fastener Press Tools (78438 A). Victor Brook. Ills. 2500 w. Machy—May, 1917. Tools and operations.

Press Tools for Typewriter Ratchets and Dials (79953). Frank A. Stanley. Ills. 1200 w. Am Mach—July 19, 1917. Design and use.

**Punching Machine**

Punching Machine with Electrically Controlled Gag (75231 A). Ills. 500 w. Engng—Nov. 24, 1916. Built at Wilmington, Del.

**Reorganization**

Reorganization of a Run-Down Plant (78953 A). Edward K. Hammond. Ills. 2500 w. Machy—June, 1917. Increased production secured by rearrangement.

**Repair Parts**

Centralized Production of Locomotive Repair Parts (79280 A). George Armstrong. Ills. 1500 w. Ry Mech Engr—June, 1917. How large economies may be effected.

**Repairs**

Oxyacetylene Repairs (81902). Charles Schaeff. Ills. 1200 w. Am Mach—Oct. 18, 1917. Details of various applications.

**Repetition Work**

Repetition Work and Machine Moulding (79023 A). A. R. Bartlett. Read before British Found. Assn. 2500 w. Mech Wld—May 18, 1917. Serial, 1st part. Points to be considered and suggestions.

**Reseating Machine**

Dexter Gate-Valve Reseating Machine (79522). Ills. 1000 w. Power—June 26, 1917. Details of machines for recutting gate-valve seats and disks.

**Rifles**

The Gage Problem in Rifle Manufacture (78701 A). 2500 w. Iron Age—May 17, 1917. Why Enfield and not Springfield rifles are made.

**Rivet Holes**

Proposes New Specification for Deducting Rivet Holes (79230). D. B. Steinman. Ills. 1200 w. Eng News-Rec—June 14, 1917. Simple practical rule which agrees with theory.

**Riveting**

Electric Riveting (78436 A). Douglas T. Hamilton. Ills. 1200 w. Machy—May, 1917. Construction and operation of machines for welding rivets.

**Roll Grinding**

Calender Roll-Grinding (77698 A). F. B. Jacobs. Ills. 1200 w. Mech Wld March 16, 1917. Application to paper-making.

**Sand Blast**

The Sand Blast: Its History and Development (76177 A). Frederick George. Ills. 4000 w. Cas Eng Mthly—Jan., 1917. Serial, 1st part. The five different systems are described in present number.

Sand-Blast Operation (81285 A). David Evans. Ills. 2000 w. Iron Age—Sept. 20, 1917. Methods described. Selection of equipment.

Some Phases of American Sand Blasting (81286 A). 1200 w. Iron Age—Sept. 20, 1917. Uses other than for cleaning castings.

**Screw Machines**

Gridley Multiple - Spindle Automatic Screw Machines (78952 A). Douglas T. Hamilton. Ills. 2500 w. Machy—June, 1917. Serial, 1st part. Design, construction, operation and tool equipment.

Screw Machine Tool Equipment (81490 A). Douglas T. Hamilton. Ills. 2500 w. Machy—Oct., 1917. Serial, 1st part. Tool equipment and attachments for the Gridley multiple-spindle automatic screw machine.

**Screws**

Making Precision Screws for Scientific Instruments (78950 A). Edward K. Hammond. Ills. 4000 w. Machy—June, 1917. Methods for cutting and testing. Instructions for using two forms of inferometers.

**Screw Threads**

Gaging and Inspecting Threads (76445 A). Douglas T. Hamilton. Ills. 7000 w. Machy—Feb., 1917. Serial, 1st part. Reviews certain questions of importance.

A Suggested Modification of the Whitworth Screw Thread (77170 A). W. C. Unwin. Ills. 1600 w. Engng—Feb. 16, 1917. Aims to remove difficulties of interchangeable screws.

Screw Thread Cutting With Dies (81489 A). Franklin D. Jones. Ills. 19 pp. Machy—Oct., 1917. Serial, 1st part. Design, operation, and application of various classes of standard and special tools, machines and attachments used in producing screw threads.

**Shapers and Slotters**

A Study of Velocity Diagrams for Shapers and Slotters (81975). A. Lewis Jenkins. Ills. 2000 w. Am Mach—Oct. 25, 1917. Serial, 1st part. Analysis of the four-bar chain linkage as applied to shaper and slotter motions.

**Sheet Metal**

Standard Practice in Sheet Metal Work for Ventilation Systems, with Suggestions for a Complete Set of Specifications (75404). T. W. Reynolds. 4000 w. Ht & Vt Mag—Dec., 1916.

**Shell Handling**

Shell-Handling Equipment at a National Factory (80089 A). Ills. 500 w. Engng—July 6, 1917. Details of plant.

**Shells**

Shell Manufacture from Cast Steel (75722 D). Edwin F. Cone. Ills. 2200 w. Iron Age—Jan. 4, 1917. Special No. Successful American practice.

Successful Shrapnel Manufacture (77064 A). Chester L. Lucas. Ills. 3500 w. Machy—March, 1917. Serial, 1st part. On management of the Westinghouse Air Brake Co. of Wilmerding, Pa.

**Shells**

Cast-Iron Shells in Permanent Molds (81977). Edgar A. Custer. Ills. 5000 w. Am Mach—Oct. 25, 1917. Read at Boston meeting of Am. Found. Assn. Advantages, provided proper foundry practice can be secured.

Making Cast Iron Shells in Permanent Molds (81655 A). Edgar Allen Custer. Read before Am. Found. Assn. Ills. 5000 w. Fndry—Oct., 1917. (Special No.) Compare advantages of cast iron and steel shells; how difficulties in molding may be overcome; German and French practice.

**Shop Practice**

Structural Shop Straight Line Assembly (74688). Charles C. Lynde. Ills. 1800 w. Stl & Iron—Nov., 1916. Grouping to eliminate extra travel of materials.

The Problem of the Job Shop (74762). Francis A. Shepherd. 2000 w. Brs Wld —Nov., 1916. Some of the problems in shops as present conducted.

A Successful Shop Suggestion System (74331 A). H. A. Russell. Ills. 1500 w. Iron Age—Nov. 2, 1916. How a manufacturer secured ideas for improvements.

Plant for Pressing and Welding Steel (76438 A). Ills. 1800 w. Iron Age—Feb. 1, 1917. Equipment of plant at

Wheatland, Pa., for making water-cooled parts for furnaces.

Press-Room Efficiency Methods (76444 A). G. R. Smith. Ills. 2000 w. Machy—Feb., 1917. Methods that reduce cost and increase production.

Machine Shop Papers (78464 A). 7 pp. A S M E, Jl—May, 1917. Abstracts of papers by A. L. De Leeuw, Fred G. Kent, and Charles Meier.

Miscellaneous Papers (78466 A). Ills. 14 pp. A S M E, Jl—May, 1917. Abstracts of papers on various topics, by F. W. Marquis; V. B. Phillips; H. Kreisinger and J. F. Barkley; S. E. Thompson, W. O. Lichtner, K. Hall and H. J. Guild; and S. H. Weaver.

Movement Minimized in Building Hupmobile Engine (79137). J. Edward Schipper. Ills. 1500 w. Auto—June 7, 1917. Serial, 1st part. Travel of parts follows concentric plan.

Plug and Ring Gauges (79306 A). F. R. Jacobs. Ills. 1800 w. Mech Wld—June 1, 1917. Gives proportions found satisfactory and suggestions for making accurate gauges.

Driving-Rod, Tire-Turning and Other Operations (80134). Frank A. Stanley. Ills. 1200 w. Am Mach—July 26, 1917. Methods and tools used.

Machining Jaws and Joints in the Small Repair Shop (79724 A). F. R. Parsons. Ills. 700 w. Mech Wld—June 22, 1917. Explains use of inexpensively made facing cutters for this work.

Changes in Shop Practice and Mechanics (81050 A). Morton C. Hutchinson. 1000 w. Am Soc Mar Dftn, Jl—July, 1917. Extracts from an address to the Delaware River Branch of the Am. Soc. of Marine Draftsmen.

Straps, Bolts, and Parallels (81713 A). F. R. Jacobs. Ills. 1700 w. Mech Wld—Sept. 21, 1917. Explains simple methods of making them at minimum cost.

**Shops**

A New Vickers Machine Gun Shop (78669 A). Ills. & Plates. 3000 w. Engng—April 27, 1917. Details of repair construction and equipment.

Plant of Van Dorn & Dutton Company (78700 A). Ills. 2000 w. Iron Age—May 17, 1917. Interesting features of construction and arrangements.

Structural Shop Has Well-Planned Framing and Layout (80679). Ills. 2000 w. Eng News-Rec—Aug. 23, 1917. Special attention paid to routing and lighting.

Engineers' Workshop Buildings (80726). 3200 w. Times Eng Supp—July 27, 1917. The problem of better design and arrangement of machine shops, etc. Details of structural design and materials.

Ideal Shop for Sharpening Drill Steel (81639). George H. Gilman. Ills. 6000 w. Eng & Min Jl—Oct. 6, 1917. A shop embracing the best features of American practice.

**Shop System**

Transportation Methods of the Westinghouse Plant (80164 A). William H. Easton. Ills. 1200 w. Ind Man—Aug., 1917. Effective use of small electric locomotives and storage battery trucks.

**Spot-Facing**

Spot-Facing Tools (80255 A). F. B. Jacobs. Ills. 1000 w. Machy—Aug., 1917. Forms of such tools and their special use.

**Springs**

Manufacture of Automobile Cushion Springs (74281 A). E. F. Lake. Ills. 3000 w. Machy—Nov., 1916. Methods of forming, conveying and treating wire springs.

Japanning Cushion Springs by the Air-Drying Process (75848 A). E. F. Lake. Ills. 2500 w. Machy—Jan., 1917. System of handling springs in an automobile plant.

Design of Heavy Helical Springs (81052 A). G. S. Childs and R. G. Kelley. Ills. 2500 w. Ry Mech Engr—Sept., 1917. Serial, 1st part. Study of spring deflections with computations for single and nest springs.

**Steam Hammers**

Some Notes on Steam Hammers (74286 A). James Cran. Ills. 1500 w. Machy—Nov., 1916. Characteristics and capacity of common types.

**Steel Balls**

Manufacture of Steel Balls (77063 A). Edward K. Hammond. Ills. 5000 w. Machy—March, 1917. Serial, 1st part. Historical outline of the industry.

Notes on Ball Milling with Special Reference to the Marcy Mill (77355 A). F. E. Marchy. 2000 w. Met & Chem Eng—March 15, 1917. Read before Min. & Met. Soc.

**Steel Sections**

Making Cold-Drawn Steel Sections (75844 A). Edward K. Hammond. Ills. 1500 w. Machy—Jan., 1917. Equipment for producing a variety of shapes from strip steel.

**Storage**

The Storage of Small Parts (80696 A). A. L. Haas. 1500 w. Mech Wld—Aug. 10, 1917. Suggestions for classification and systems of arrangement.

**Tempering**

La Trempe Des Produits Métallurgiques (78296 B). L. Guillet. Ills. 2300 w. La Nat—Mar. 31, 1917. Methods of heat treatment of metals used in France.

**Tool Design**

Inclined Plane in Tool Design (75877 A. W. G. Groocock. Ills. 1000 w. Mech Wld—Dec. 22, 1916. Serial, 1st part. Adaptations of the principle as applied to boring, threading, and recessing bars.

**Tools**

Shell and Gun-Making Tools (74492 A). Ills. 500 w. Engng—Oct. 20, 1916. Tools for heavy munitions work. Electrically-driven lathes and machine tools.

Portable Tools for Lathe Manufacture (78434 A). Edward K. Hammond. Ills. 3000 w. Machy—May, 1917. Details of special tools.

The Manufacture and Use of Form-Tools (78383 A). Ills. 1200 w. Mech Wld—April 13, 1917. Methods described.

The Machine Tool Trade (80036). 1000 w. Times Eng Supp—June 29, 1917. Organization and coöperation.

**Traps**

Making a Sanitary Trap (74276 A). Ernest A. Walters. Ills. 600 w. Machy—Nov., 1916. Detailed description of work.

**Tumbling**

The Tumbling Barrel (80251 A). G. R. Smith. 1500 w. Machy—Aug., 1917. History and use.

**Turret Lathe**

Gridley Automatic Turret-Lathe (78437 A). Douglas T. Hamilton. Ills. 3000 w. Machy—May, 1917. Design, construction, operation and tool equipment.

Turret for Turning the Copper Bands on Shells (79976 A). Ills. 400 w. Engng—June 29, 1917. Arrangement adopted in many types of machines.

**Valves**

Valve Design (81845 A). A. L. Haas. 2000 w. Mech Wld—Sept. 28, 1917. Details of design discussed.

**Wastes**

Utilization of Factory Wastes (81445 A). C. B. Auel. Ills. 2000 w. Ind Man—Oct., 1917. Methods of Westinghouse Electric Co.

**Welding**

Electric Welding in Railroad Shops (74450 A). Gordon Fox. Ills. 5000 w. Ry Mech Engr—Nov., 1916. Processes and their many applications.

Electric Arc Welding (75027). 3000 w. Ry Rev—Dec. 2, 1916. Sub-committee report to Assn. of Ry. Elec. Engrs. Summary of fundamentals.

Electric Arc Welding in Locomotive Repair Shops (75481). R. E. Kinkead. Ills. 1500 w. Ry Rev—Dec. 23, 1916. Methods and costs.

Pressure Tests of Welded Boiler-Tube Vessel (75062). Robert Cramer. Ills. 1200 w. Power—Dec. 5, 1916. Weld did not show weakness.

Electric Seam-Welding (75850 A). Douglas T. Hamilton. Ills. 2500 w. Machy—Jan., 1917. Methods of joining sheets and tubes by the resistance welding process.

Some Information on Arc Welding (76538 A). F. G. De Saussure. Ills. 1800 w. Ry Mech Engr—Feb., 1917. Effect of varying current, and efficiency.

The Pencil Electrode Method of Welding for Boiler Joints (77763 A). E. A. Wildt. Ills. Abstract and discussion. 4000 w. A S M E, Jl—April, 1917. Special reference to the welding of joints of drums.

Welding by the Electric Arc Process (77904). Ills. 1600 w. Ry Rev—April 7, 1917. Distinction between carbon electrode and metal electrode processes of arc welding and the principal uses of each.

Electric-Arc Welding for Foundry Purposes (78431). R. R. Clarke. 4500 w. Fndry—May, 1917. Practical applications.

Welding a Large Cast-Iron Spider (80132). J. D. Cumming. Ills. 1600 w. Am Mach—July 26, 1917. Way the troubles were overcome.

A Day's Work in a Railroad Welding Shop (80548 A). B. Kopferschmidt. Ills. 1000 w. Weld Engr—Aug., 1917. Record of a day's work with the temperature at 93° and above.

Miscellaneous Uses of the Oxy-Acetylene Torch (80547 A). David Baxter. 1800 w. Weld Engr—Aug., 1917. Suggestions for unusual and emergency applications.

Oxy-Acetylene Welding in Machine Shop, Shop, and Tool Room (80550 A). J. H. Rodgers. Ills. 4500 w. Weld Engr—Aug., 1917. Extent of applications of this process.

Oxy-Acetylene Welding of Copper, Brasses and Bronzes (80549 A). M. R. Amedeo. Ills. 2500 w. Weld Engr—Aug., 1917. Serial, 1st part. Physical and chemical properties, oxidation, flame regulation, etc.

Oxy-Acetylene Advanced Operations (80918 A). B. Kofferschmidt. Ills. 1200 w. Weld Engr—Sept., 1917. Details of difficult operations.

Spot Welding at the Chalmers Plant (80938). Ills. 500 w. Am Mach—Sept. 6, 1917. Applications and possibilities.

Welding Aluminum (80919 A). David Baxter. 3000 w. Weld Engr—Sept., 1917. Directions for successful work, describing an example.

Arc Welding in Steel Foundries (81788 A). D. B. Truitt. 2200 w. Weld Engr—Oct., 1917. The work of the welder.

Autogenous Welds of Boiler Plates (81789 A). Abstract of article by E. Hohn, in *The Locomotive*. Ills. 1000 w. Weld Engr—Oct., 1917. Methods of making welds and their after treatment and testing.

**Welds**

Welds—The Weaknesses and Merits of Their Structure (79521). P. A. E. Armstrong. Ills. 4500 w. Power—June 26, 1917. Believes that welding is surely the future means of joining the sheets of pressure vessels, etc. Valuable article on the microstructure of welds.

**Wire**

Wire Straighteners (78962 A). Frank H. Mayoh. Ills. 1000 w. Machy—June, 1917. Principle of action.

Cold-Heading of Wire (81492 A). Roy H. Smith. Ills. 2000 w. Machy—Oct., 1917. Comparative lengths of wire upset under different conditions.

**Works**

The Turin Engineering Works of the Fiat San Georgio Company (74759 A). Ills. 1100 w. Engng—Nov. 10, 1916. Works for manufacture of internal-combustion engines.

**Workshops**

Equipment of Engineering Workshops (77924 S). Ralph N. Lewis. 2500 w. Comwh Engr—March, 1917. Serial, 1st part. Points for consideration in the purchase of plant.

**Wrench**

The Wrench (77953). Ills. 3300 w. Ir Trdsn—April, 1917. One of a series of articles on common tools.

# MATERIALS OF CONSTRUCTION

**Abrasives**

Selecting Abrasives for Specific Uses 75611 A). R. G. Williams. Ills. 3200 w. Ind Man—Jan., 1917. Natural and artificial abrasives, the latter being produced in the electric furnace.

The Grinding Wheel—A Connecting Link Between the Electric Furnace and the Automobile (78404 N). Richard G. Williams. 15 pp. Am El-Chem Soc—May, 1917. Various artificial abrasives and their uses.

Abrasive Paper and Cloth (79384 A). F. B. Jacobs. 1500 w. Mech Wld—June 8, 1917. Reviews the history of their manufacture.

**Alloys**

Design of Acid-Resisting Iron Apparatus (75072 A). Norman Swindin. Ills. 2500 w. Met & Chem Eng—Dec. 1, 1916. Design of plant and apparatus required by the chemical engineer.

The Analysis of Brass and Bronze (75300 F). J. N. Lawrence. 6000 w. Am Soc Nav Engrs, Jl—Nov., 1916. Methods in use at Annapolis, Md.

Metal Fittings of Digesters (76183). Sidney E. Lunak. 1000 w. Brs Wld—Jan., 1917. Acid resisting qualities of different alloys.

A Bibliography of Alloys: Binary, Ternary and Quarternary Systems Whose Equilibria Have Been Investigated (76989 A). Clarence Estes. Chart. 9 pp. Met & Chem Eng—March 1, 1917.

The Analysis of Nickel Chromium Alloys (77352 A). Emil D. Koepping. 2500 w. Met & Chem Eng—March 15, 1917. Procedure and methods.

Alloys of the Non-Ferrous Metals (77818 A). W. M. Corse and G. F. Comstock. Ills. 1500 w. Iron Age—April 5, 1917. Development in their scientific study. Manganese and aluminum bronze.

Boronized Metals: Some Minute Aspects (78184). James Scott. Ills. 1500 w. Brs World—April, 1917. Investigation of the merits of boron as a dioxidizer in alloy preparation.

Metallic Alloys, With Particular Reference to Brass and Bronze (77761 A). William M. Corse. Ills. 2500 w. A S M E, Jl—April, 1917. Their scientific study and development.

Acid Resisting Properties of Some Iron-Silicon Alloys (78408 N). O. L. Kowalke. 6 pp. Am El-Chem Soc—May, 1917. Investigation to determine the resistance to several common acids.

Iron in Aluminum Bronze (78780). C. Vickers. Ills. 2000 w. Brs Wld—May, 1917. When it is desirable; methods of adding iron.

Brass and Other Copper Alloys Used in Marine Engineering (79301 A). J. T. Milton. 3500 w. Mech Engr—May 25, 1917. Serial, 1st part. As used by marine engineers. Read before the Inst. of Marine Engrs.

Improvements in Magnetic Iron Alloys (79025 A). Abstract from *Génie Civil*. Ills. 2500 w. Elec Rev—May 18, 1917. Report of recent progress in electrical irons.

New Alloys to Replace Platinum (79084 B). F. A. Fahrenwald. 6500 w. Jl Ind & Eng Chem—June, 1917. Production, market, and uses of platinum; specifications for a substitute; possibilities, etc.

Cobaltcrom, the New Steel Alloy (80092 A). 600 w. Engng—July 6, 1917. Information concerning a tool steel of which tungsten is not a component.

The Properties of Solid Solutions of Metals and of Inter-Metallic Compounds. Also, The Annealing of Metals (80515 N). Two papers by F. C. Thompson, discussed together. 16 pp. Faraday Soc, Trans—June, 1917. Research work.

The Strength of Copper Alloys (80783 A). 2000 w. Engng—Aug. 10, 1917. Editorial on papers by A. D. Flinn and by Ernst Jonson, recently published in America.

Notes on the Analysis of Alloys of Nickel and Zirconium (80949 B). 800 w. Jl Ind & Eng Chem—Sept., 1917. Outline of method used.

Transformations in Alloy of Gold With Copper (81314). N. Kurnakow. S. Zemczuzny and M. Zasedatelev. Ills. 2500 w. Brs Wld—Sept., 1917. Serial, 1st part. Report of investigations of the thermic analysis and the microstructure, the electro-conductivity, and the hardness.

A New Anti-Friction Alloy (81894 A). Raymond Francis Yates. 1000 w. Sib Jl Eng—Oct., 1917. Information concerning a useful substance known as "graphalloy."

Preparation of Pure Alloys for Magnetic Purposes (81988 N). Trygve D. Yensen. Ills. 18 pp. Am Elec Chem Soc—Oct., 1917. Reasons why pure iron, and iron containing elements which do not separate its crystals from each other, have great magnetic permeability and low hysteresis losses.

See also same heading under ELECTRICAL ENGINEERING, *Electro-Physics.*

**Alloy Steel**

The Composition of Alloy Steel an Important Factor in Counter-balancing Locomotives (81539 A). Ills. 2500 w. Ry & Loc Eng—Oct., 1917. The function of nickel, chromium or vanadium. The essentials in the problem.

**Aluminum**

Aluminum in Modern Automobile and Aviation Construction (74354 B). James E. Diamond, with discussion. Ills. 20 pp. S A E, Bul—Oct., 1916. Physical properties, casting, development, etc.

Aluminum in Modern Automobile and Aviation Construction (74849). James E. Diamond. Ills. 2500 w. A A Wkly—Nov. 27, 1916. Serial, 1st part. Physical properties of the metal, applications, advantages, etc.

The Recovery of Metal from Aluminium Swarf and Chips (75879 A). 2000 w. Mech Wld—Dec. 22, 1916. Suggestions and difficulties with waste metal.

Aluminum Production by Electrolysis; A Note on the Mechanism of the Reaction (77941 N). Richard Seligman. 1500 w. Inst Met—March 21, 1917. Account of experimental work.

Aluminum (78564 A). 2200 w. Autocar—April 21, 1917. Interesting facts from a paper read before the Coventry Engng. Soc.

The Changes in Physical Properties of Aluminium with Mechanical Work (80516 N). F. J. Brislee, with discussion. 2500 w. Faraday Soc, Trans—June, 1917. Specific heats of hard and soft aluminium. Research work and conclusions.

**Asbestos Rope**

The Tensile Strength of Asbestos Rope When Exposed to Fire (74758 A). J. Bobaricoff and W. Mramornoff. 1500 w. Engng—Nov. 10, 1916. Tests made at Tomsk, Siberia.

**Babbitt Metal**

Comments on the Analysis of Babbitt Metal (77965 N). J. C. Witt. 2500 w. Phil Jl Sci—July, 1916. Shows there is no general method that may be equally well applied to all samples.

**Balsa Wood**

The Properties of Balsa Wood (79196 B). R. C. Carpenter. Ills. 23 pp. Am Soc Ref Engrs Jl—May, 1917. Investigation to ascertain its strength and insulating qualities Also discussion.

**Belts**

Leather Belting Research (80152 A). Louis W. Arny. 1500 w. Ind Man—Aug., 1917. How experimental investigations should be conducted.

**Brass**

Failure of Brass.—1.—Microstructure and Initial Stresses in Wrought Brasses of the Type 60 Per cent Copper and 40 Per Cent Zinc (76787 A). Paul D. Merica and R. W. Woodward. Ills. 70 pp. U S Bur Stds, Tech paper No. 82—Jan. 29, 1917. Investigations and conclusions.

A Comparison System for Determining and Standardizing the Grain Size of Annealed Brass (77737 A). George A. Miller, Jr. Ills. 1000 w. Met & Chem Eng—April 1, 1917. Systems used, and details of comparison machine.

Inspection of Brass and Bronze (79501 N). Alfred D. Flinn and Ernst Jonson. 11 pp. Am Soc Test Mat—June, 1917. Test recommended to be incorporated in every specification.

Internal Stresses in Wrought Brass and Bronze (81151 F). D. J. McAdam, Jr. Ills. 1500 w. Am Soc Nav Engrs, Jl—Aug., 1917. Failures due to internal stresses; method of measurement of internal stress; causes of high stresses, etc.

Metallography of Brass (81426 N). C. H. Mathewson and Philip Davidson. Ills. 50 pp. A. I. Mt, Jl—June, 1917. Development and reabsorption of the Beta constituent in alloys of the Alpha type.

Experiments on the Fatigue of Brasses (81717 A). B. Parker Haigh. Ills. 5000 w. Engng—Sept. 21, 1917. Read before British Institute of Metals, Sept. 19, 1917. Experiments showing that the effects of corrosion and fatigue are mutually associated.

**Briquetting**

The Briquetting of Metal Swarf (79589 A). Ills. 2200 w. Engr—June 8, 1917. Serial, 1st part. Remarks on the neglect of this waste in England.

**Bronzes**

Bearing Bronzes and the Microscope (78079 A). C. H. Bierbaum and Verne Skillman. Ills. 700 w. Iron Age—April 19, 1917. Determining the causes of the difference in static properties of alloys of nearly the same composition.

**Cast Iron**

Cast Iron: With Special Reference to Engine Cylinders (75638 A). J. Edgar Hurst. Abstract of paper before the Manchester Assn. of Engrs. 3500 w. Mech Engr—Dec. 15, 1916. Serial, 1st part. A study of aspects of the application of cast iron to engine cylinders.

Cast Iron: With Special Reference to Engine Cylinders (76386 A). J. Edgar Hurst. Ills. 2500 w. Engng—Jan. 12, 1917. Serial, 1st part. Read before the Manchester Assn. of Engrs. A study from a metallurgical standpoint.

Some Unusual Results of Cast-Iron Tests (78699 A). Paul R. Ramp. 2500 w. Iron Age—May 17, 1917. How to draw proper conclusions.

Report of Committee A-3 on Cast Iron (79511 N). 11 pp. Am Soc Test Mat—June, 1917. Proposed tentative specifications for cast-iron soil pipe and fittings; and for railroad malleable-iron castings.

**Cements**

Plastic Cements (79722 A). J. B. Barnitt. 2000 w. Mech Engr—June 22, 1917. From Gen. Chem. Bul., Laurel Hill Laboratory. Instructions on the application; materials used, etc.

**Coatings**

Protective Coatings: Lacqueres (77091). E. P. Later. 3000 w. Fndry March, 1917. Serial, 1st part. Finishing and protecting metals.

Giving Metals a Rust-Proofing Treatment (77116 A). Ills. 1200 w. Iron Age. March 8, 1917. Process developed by Parker Rust-Proof Co.

**Cobalt Alloys**

Cobalt Alloys with Non-Corrosive Properties (76834 N). Herbert T. Kalmus and K. B. Blake. Ills. 36 pp. Can Dept Mines—No. 411. Part IV of a series of investigations conducted at Queens University, Kingston, Ont.

**Cold Rolled Steel**

Making and Buying Sheet and Strip Stock (78481). F. Walter Guibert. 3500 w. Bt Fc & Stl Pt—May, 1917. Cold rolled steel from viewpoint of maker and user.

**Conservation**

Conservation of Material and Supplies (81535). 4800 w. Ry Rev—Sept. 29, 1917. From bulletin issued by the M. K. & T. Ry giving hints to employees on the economical use of materials and supplies.

**Copper Wire**

The Hardness of Hard-Drawn Copper (79504 N). E. H. Peirce. 7 pp. Am Soc Test Mat—June, 1917. Tests of hard-drawn copper wire, with conclusions.

**Core Sand**

Negative Experiments on Waste Core Sand (81428 N). H. W. Gillett and E. L. Mack. 2500 w. A I. Mt, Jl—June, 1917. Report of investigations.

**Cork**

Cork—Its Origin and Uses (78071 B). H. W. Prentis, Jr., with discussion. Ills. 16 pp. S A E Bul—March, 1917. Details of the growth, methods of removal, shipment, uses, manufacture, etc.

**Corrosion**

Interior Surface Defects on Brass Condenser Tubes as a Cause of Corrosion (79492 N) W. Reuben Webster. Ills. 6 pp. Am Soc Test Mat—June, 1917. Invetigation shows there is no basis for such a belief.

Report of Committee A-5 on Corrosion of Iron and Steel (79497 N). 32 pp. Am Soc Test Mat—June, 1917. On preservative metallic coatings for metals.

Review of Condenser-Tube Corrosion (79201). Charles H. Bromley. 3000 w. Power—June 12, 1917. Important results of Bengough's most recent research, etc. Applications.

The Corrosion of Metals by Acids (81732 N). Oliver P. Watts and Newton D. Whipple. 23 pp. Am El-Chem Soc—Oct., 1917. Theoretical deductions from experimental study.

The Corrosion of Fence Wire (81984 N). Oliver W. Storey. Ills. 27 pp. Am

Elec-Chem Soc—Oct., 1917. Analyses of the wires and descriptions of their condition. Copper a strong protective; manganese without influence.

See same heading under *Steam Engineering*.

**Cotton**

Cotton Fumigation (81942). Ills. 2200 w. Trav Stand—Oct., 1917. Methods and apparatus used in destroying the pink boll worm.

**Cotton Supply**

The World's Cotton Supply and India's Share in It (75969 A). John Aiton Todd, with discussion. 4500 w. Roy Soc Arts, Jl—Dec. 29, 1916. Outlines the present position of the cotton industry, and prospects in India.

**Dull Tools**

How Dull Tools Displace the Grain of Bearing Metals (81900). Christopher H. Bierbaum. Ills. 1400 w. Am Mach—Oct. 18, 1917. Demonstrates what happens to bearing metals when precautions are not taken against dull tools.

**Eggertz Test**

The Eggertz Test for Combined Carbon in Steel (81602 N). J. H. Whiteley. Ills. 101 pp. Ir & St Inst—Sept., 1917. Study of the problems connected with the color method for the rapid estimation of combined carbon in ordinary steels.

**Endurance**

The Influence of Speed on Endurance Tests (74498 A). W. C. Popplewell. 3000 w. Engr—Oct. 20, 1916. Experimental study of the effect of time on reversals of stress.

**Explosives**

The Application of Nitro Aromatics in Explosive Industry (77347 A). John R. Mardick. 2000 w. Met & Chem Eng—March 15, 1917. Possibilities of using trinitrotoluol and picric acid in the manufacture of explosives.

Nitro-Starch as an Explosive (77733 A). S. S. Sadtler. 4000 w. Met & Chem Eng—April 1, 1917. Rapid growth of the use of high explosives; qualities required; the advantages and disadvantages of nitro-starch.

Composition and Characteristics of Explosives (78959 A). A. Schleimer. 1700 w. Machy—June, 1917. Information concerning modern explosives.

**Fertilizers**

American Smelting and Refining Company's Tests with Sulphur and Sulphuric Acid on Soils (79254). P. J. O'Gara. Ills. 2500 w. Min & Sci Pr—June 16, 1917 Tests and results of using sulphur as a fertilizer.

**Firebrick**

The Texture of Firebricks (80518 N). J. W. Mellor. Ills. 11 pp. Faraday Soc, Trans—June, 1917. Machine vs. hand-made firebricks, etc.

Les Briques De Silice (80724C + D). H. Le Chatelier. Ills. 3000 w. Rev Met—Mar.-April, 1917. Physical properties of silica brick composed of cristobalite and tridymite.

**Fireproofing**

Report of Committee C-5 on Fireproofing (79472 N). 700 w. Am Soc Test Mat—June, 1917. Classification of materials and construction; conduct of fire tests, etc.

**Foundry Irons**

The Chemical and Physical Properties of Foundry Irons (74327 A). J. E. Johnson, Jr. Ills. 6500 w. Met & Chem Eng—Nov. 1, 1916. Serial, 1st part. Present status of knowledge of this important subject.

**Furnace Cement**

Tests of High Temperature Furnace Cement (74763). W. S. Quigley. Read before Phila. Found. Assn. 2000 w. Brs Wld—Nov., 1916. Results obtained with fire brick cements.

**Galvanized Iron**

The Stripping and the Analysis of Galvanized Iron (77963 N). George W. Heise and Amando Clemente. 3000 w. Phil Jl Sci—July, 1916. Outline of various methods.

The Testing of Galvanized Iron (77964 N). J. C. Witt. 5500 w. Phil Jl Sci—July, 1916. Comments on methods usually employed.

**Glass**

Art of Coloring Glass (80273B). H. Rosenthal. Ills. 2500 w. Jl Ind & Eng Chem—Aug., 1917. Details of experimental work in the art of coloring glass by artificially produced short-wave lengths of light.

Welding Glass in Optical Contact (76379 A). Ills. 2500 w. Engng—Jan. 12, 1917. Experiments described by G. R. Parker and A. J. Dalladay before the Faraday Society.

The Glass Industry (81884 B). 420 pp. U S Dept Com—Misc Series No. 60. Report on conditions and cost of production in the United States.

**Glue**

Glue for Use on Aeroplanes (77805 B). Percy A. Houseman. 1500 w. Jl Ind & Eng Chem—April, 1917. Use and tests.

**Grain Growth**

Grain Growth Phenomena in Metals (74645 D). Zay Jeffries. Ills. 11 pp. A I M E, Bul—Nov., 1916. Factors influencing fast growth; fast growth in low-carbon steel; effect of cold deformation.

**Graphite**

Le Graphite (80706 B). J. Escard. 5300 w. Rev Gen Sci—July 15, 1917. General properties, where found, uses, etc.

**Guayule**

Guayule and Industrial Preparedness (74592 A). Andrew H. King. Ills. 3500 w. Met & Chem Eng—Nov. 15, 1916. Possibilities of the guayule plant as a source of rubber production in the United States.

**Gun Erosion**

Erosion of Guns—the Hardening of the Surface (75264 D). Henry Fay. Ills. 8000 w. A I M E, Bul—Dec., 1916. Results of observations, experiments, and various tests.

**Hardness**

Hardness and Hardening (82044). 2000 w. Times Eng Supp—Sept. 28, 1917. Paper by Prof. T. Turner before British Institute of Metals on hardness, and methods of hardening metals.

The Effect of Great Hydrostatic Pressure on the Physical Properties of Metals (81959 A). Zay Jeffries. 1500 w. Engng—Oct. 5, 1917. Experiments showing an increase in hardness.

Hardness and Hardening (81719 A). T. Turner. 5000 w. Engr—Sept. 21, 1917. Read before British Inst. of Metals, Sept., 1917. Definitions and measurement of hardness and methods of hardening.

**Heat Treatment**

Heat Treatment of Automobile Steels (74353 B). Robert R. Abbott, with discussion. Ills. 12 pp. S A E, Bul—Oct., 1916. Qualities required and methods of treatment.

Notes on the Heat Treatment of Grey Cast Iron (81599 N). J. E. Hurst. Ills. 7 pp. 'Ir & St Inst—Sept., 1917. Study of the properties of cast iron for internal combustion engine cylinders.

The Influence of Heat Treatment on the Electrical and Thermal Resistivity and Thermo-Electric-Potential of Some Steels (81597 N). Edward D. Campbell and William C. Dowd. 12 pp. Ir & St Inst—Sept., 1917. Study of the correlation of electric and thermal properties of steel in the light of the solution theory.

**Insulation**

The Effect of Heat on Cotton and Paper (80375 A). L. Schuler. Abstract from *Elek. Zeit.* 700 w. Elec'n—July 20, 1917. Experiments to determine their value for insulating purposes.

**Iron**

Aargauische und schweizerische Eisenproduktion in Vergangenheit und Zukunft (74913 B). A. Trautweiler. Ills. Serial, 1st part. 2100 w. Schweiz Bau—Oct. 28, 1916. Brief history of iron, from earliest times.

**Lacquer**

Chinese Lacquer (77432). 1700 w. Brs Wld—March, 1917. Information concerning the No. 1 Foochow lacquer.

**Leather**

Leather—Treatment and Manufacture (79079 A). Lloyd Balderston. 7500 w. E Cb Phila, Pro—June, 1917. Methods, materials and processes used in this industry.

Leather from Shark Skins—Product of Large Florida Factory (80148). 1800 w. Mfrs' Rec—July 26, 1917. $300,000 plant at St. Petersburg, Fla., to tan shark hides.

**Lubricants**

Roll-Neck Lubricants: Their Reclamation (75083). William M. Davis. 2200 w. Blt Fc & Stl Pt—Dec., 1916. Heavy greases considered.

Oils, Fats and Greases (77114 A). 2000 w. Ry & Loco Eng—March, 1917. Microscopic conditions of bearing surfaces; theory of lubrication, etc.

Chemistry and Examination of Lubricating Oils (77104 A). Elliott A. Evans. 2500 w. Mech Engr—Feb. 23, 1917. Serial, 1st part. Their composition, behavior, etc.

Resistance of an Oil to Emulsification (77261). Winslow H. Herschel. Ills. 35 pp. U S Bur Stds, No. 86—Feb. 17, 1917. Apparatus and method of testing oils.

Tests of Coolers for Lubricating Oil (77416 A). Ills. 2000 w Engng—March, 1917. M. Boella, in *Revista Marittima*. Account of experiments with several types of coolers.

Handling Lubricants (78371). John Rome Battle. Ills. 2500 w. Prac Eng, Chi—May 1, 1917. Serial, 1st part. Storage and checking methods.

A Study of Graphite and of Its Compounds for Lubricating Purposes (80887 A). Christopher H. Bierbaum. Ills. 3500 w. A S M E, Jl—Sept., 1917. The origin, classification, uses, and expedients in using it as a lubricant.

**Lubricating Oils**

The Selection of a Lubricating Oil (79523). H. J. Macintire. Ills. 2500 w. Power—June 26, 1917 Describes briefly the accepted theory of lubrication of bearings, giving various tests for lubricants.

**Malleable Iron**

Fallacies Regarding Malleable Iron (81053 A). A. H. Weston. Ills. 2700 w.

Ry Mech Engr—Sept., 1917. Its usefulness generally underestimated.

**Metallography**

On Grain Growth (75250 D). Henry M. Howe. 3000 w. A I M E, Bul—Dec., 1916. Study of causes of coarsening of metals, suggesting new terms for expressing novel ideas.

**Metals**

How We May Conserve Our Metal Resources (79066). Charles Vickers. Ills. 6000 w. Fndry—June, 1917. Designers and foundrymen should aid by reducing the weight of cast parts to minimum allowable, and substitution where possible.

**Mother-of-Pearl**

The Colors of Mother-of-Pearl (78119 B). A. H. Pfund. Ills. 10 pp. Kkn Inst, Jl—April, 1917. Work to ascertain the cause of iridescence.

**Nichrome**

Industrial Applications of Nichrome (78961 A). Franklin D. Jones. Ills. 1500 w. Machy—June. 1917. A nickel-chromium alloy having considerable strength at high temperatures and other remarkable properties.

**Non-Ferrous Metals**

Report of Committee B-2 on Non-Ferrous Metals and Alloys (79508 N). Ills. 12 pp. Am Soc Test Mat—June, 1917. Mainly a report on sand-cast alloys.

**Optical Glass**

On a Precise Method of Uniting Optical Glass—The Union of Glass in Optical Contact by Heat Treatment (78821 A). R. G. Parker and A. J. Dalladay. Abstract of paper before the Faraday Soc. 2000 w. Elec'n—May 4, 1917. Process by which a more perfect joint can be obtained.

**Paints**

Some Tests on a Fire-Resisting Paint (80809 B). Q. R. Dungan. Ills. 1200 w. Univ Col Jl Eng—April, 1917. Reports tests and results.

**Paper**

The Physical Testing of Paper as Affected by Humidity (79756 B). Ross Campbell. 1000 w. Jl Ind & Eng Chem —July, 1917. Report of tests.

**Proposed Specifications**

Proposed Tentative Specifications and Revisions (79469 N). 23 pp. Am Soc Test Mat—June, 1917. Covers brass forging rod; free-cutting brass rod; non-ferrous alloys; spelter; etc.

**Purchasing**

Visualising Promises of Material Shipments (81754 A). H. A. Russell. Ills. 1500 w. Iron Age—Oct. 11, 1917. Scheme followed by a purchasing department.

**Recrystallization**

Recrystallization After Plastic Deformation—Grain Growth Phenomena in Metals—On Grain Growth (78129 D). Ills. 3000 w. A I M E, Bul—April, 1917. Discussion of the papers of Henry M. Howe and Zay Jeffries.

**Refractories**

A Study of the Silica Refractories (74643 D). J. Spotts McDowell. Ills. 55 pp. A I M E, Bul—Nov., 1916. Investigation at the laboratory of the Mass. Inst. of Tech.

Deterioration of Refractory Materials (74462 A). H. B. Cronshaw. Ills. 4500 w. Iron Age—Nov. 9, 1916. Conditions affecting silica and fire brick in open-hearth furnaces.

Refractory Linings and Materials (77776). J. W. Houlman. 600 w. Bt Fc & Stl Pt—April, 1917. Serial, 1st part. Methods of obtaining best results with refractories used in steel plants.

Refractory Materials (79437). 1800 w. Times Eng Supp—May 25, 1917. Requirements for the steel industry. Abstract of paper by Cosmo Johns before Iron & Steel Institute.

Report of Committee C-8 on Refractories (79473 N). Ills. 19 pp. Am Soc Test Mat—June, 1917. Proposed tentative methods for ultimate chemical analysis; test under cost at high temperatures; slagging action, etc.

Refractory Materials (80517 N). Ills. 49 pp. Faraday Soc, Trans—June, 1917. A general discussion, and bibliography and tables.

The Application of Petrographic Methods to the Study of Refractory Materials (80519 N). W. G. Fearnsides. 2500 w. Faraday Soc, Trans—June, 1917. Methods of study of refractory materials.

The Deterioration of Refractory Materials in the Iron and Steel Industries. Also, The Standardization of Refractory Materials Used in the Iron and Steel Industries (80523 N). Two papers by H. B. Cronshaw. Ills., bibliography, etc. 16 pp. Faraday Soc, Trans—June, 1917.

The Examination of the Texture of Unfired Refractories (80520 N). R. Lessing. Ills. 1500 w. Faraday Soc, Trans—June, 1917. Method of testing to ascertain the texture and composition.

Zirconia as a Refractory Material (80791 A). J. A. Audley. Excerpts from paper before Ceramic Soc., Leeds. 2000 w. Ir & Cl Trds Rev—Aug. 10, 1917. Composition, technical applications, structure, etc.

The Refractory Properties of Silica Bricks (81349 A). H. H. Le Chatelier and B. Bogitch. 1700 w. Colly Gdn—Sept. 7, 1917. Results of experiments.

Fireclays and Ganisters of the South of Scotland (81962 A). L. W. Hinxman and M. MacGregor. 6000 w. Colly Gdn—Oct. 5, 1917. Read before Ceramic Soc, Glasgow. Information concerning the millstone grit, upper and lower fireclay, etc.

Palmerton Zinc Refractories (81585 D). C. P. Fiske. Ills. 20 pp. A I M E, Bul—Oct., 1917. Manufacture of spelter vessels, spelter condensers, and high-grade fire-brick.

Testing Refractory Materials (81963 A). J. W. Mellor. From paper before Ceramic Soc, Glasgow. 2500 w. Colly Gdn—Oct. 5, 1917. Importance of standardizing tests, and properties and methods of testing.

**Refractory Materials**

Supplies of Refractory Materials Available in the South Yorkshire Coalfield (76894 N). W. G. Fearnsides. Notes taken at a discourse, with discussion. 19 pp. Instn Min Engrs, Trans—Jan., 1917.

**Rolled Steel**

Defects in Finished Rolled Steel (79702 A). George W. Dress. Ills. 800 w. Iron Age—June 28, 1917. Slag inclusions, splits in rails, and manufactured pipes.

**Rubber**

Synthetic Rubber (78428 A). Andrew H. King. 6500 w. Met & Chem Eng—May 1, 1917. Review of proposed methods for the production.

The Influence of Pigments on Rubber (79761 B). Maximilian Toch. 2000 w. Jl Ind & Eng Chem—July, 1917. Information concerning fillers and reinforcing pigments.

Rubber Soles (79894 A). Andrew H. King. 1500 w. Met & Chem Eng—July 15, 1917. Improvements in manufacture and advantages of rubber soles.

**Rubber Hose**

Rubber Hose for Use on Aeroplanes (77804 B). Percy A. Houseman. 2500 w. Jl Ind & Eng Chem—April, 1917. Specifications for gasoline-resistant rubber tubing. Tests found to be suitable for controlling the quality.

**Rubber Industry**

A Glossary of Terms Used in the Rubber Industry (77738 A). Frederic Dannerth. 3500 w. Met & Chem Eng—April 1, 1917. Statement of terms. Of use to those testifying in legal cases involving rubber products.

**Rubber Insulation**

Report of the Joint Rubber Insulation Committee (77154 B). Ills. 8 pp. Jl Ind & Eng Chem—March, 1917.

**Rubber Sponge**

Rubber Sponge (75349 A). Andrew H. King. 1200 w. Met & Chem Eng—Dec. 15, 1916. Its proposed use for tire filler and other applications.

**Sand**

A Study of the Steel Foundry Sand Problem (80265). G. Muntz and E. Roubien. Ills. 4500 w. Fndry—Aug., 1917. Sand must be plastic, non-yielding, permeable to gases, and capable of resisting high temperatures.

Sands Used in Metallurgical Practice (80390 A). P. G. H. Boswell. Abstract of paper read before Soc. of Chem. Ind., at Birmingham, Eng. 4000 w. Colly Gdn—July 20, 1917. Chemical analyses of sands and the information they supply.

**Shell Steel**

The Composition of Shell Steel (80270 A). Reginald Trautschold. 1500 w. Met & Chem Eng—Aug. 1, 1917. The chemical specifications of England and Germany.

**Silica Brick**

L'Etat Actual De La Fabrication Des Briques De Silice (77569 C +D). H. Le Chatelier. 3200 w. Rev Met—Sep.-Oct., 1916. Review of subject and work done by Faraday Society and Am. Inst. Min. Engrs.

**Springs**

Testing Springs for Military Rifles (79665 A). S. N. Bacon. Ills. 1200 w. Machy—July, 1917. Firing, vibrating, and weight tests.

**Steel**

Influence of Phosphorus and Sulphur on the Mechanical Properties of Steel (76909 A). H. C. H. Carpenter. 1200 w. Nature—Jan. 25, 1917. New light on the subject from experience in war.

Steels Suited to Aeronautical Purposes (77675 A). G. A. Richardson. 3500 w. Iron Age—March 29, 1917. Requirements for different uses.

Strength and Inner Structure of Mild Steel (78209 A). W. E. Dalby. Read before the Instn Nav Archts. Plates & Ills. 4000 w. Engrg—April 6, 1917. Shows how the strength is correlated with inner structure.

The Use and Abuse of Steel (78228 N). R. K. Bagnall-Wild and E. W. Birch. Ills. 29 pp. Instn Auto Engrg—March, 1917. Troubles experienced by manufacturers in the construction of aeronautical components.

**Stress**

The Resistance of Iron and Steel to Complete Reversals of Stress (74481 A). W. C. Popplewell. 2000 w. Eng Rv—Oct. 16, 1916. Notes on recent experiments.

**Surface Tension**

Surface Tension and Cohesion in Metals and Alloys (77940 N). Sydney W. Smith.

38 pp. Inst Met—March 21, 1917. Shows relation between surface tensions and internal pressure, compressibility and atomic volume, and explains other phenomena. Also bibliography.

**Synthetic Rubber**

L'état Actuel Du Problême De La Synthèse Du Caoutchonc (78255 B). B. D. W. Luff. 3500 w. Rev Gen Sci—Mar. 15, 1917. Present status and future success of the synthesis of rubber.

**Tin**

The Electrolytic Determination of Tin on Tinned Copper Wire (79498 N). George G Grower. Ills. 23 pp. Am Soc Test Mat—June, 1917. A method that may be used to determine the quantity of free and alloyed tin.

**Tool Steel**

The Selection of Tool Steel (77106 A). A. L. Haas. 2200 w. Mech Wld—Feb. 23, 1917. Varieties and their virtues.

Recherche de la Meilleure Utilisation des Aciers à Outils (82082 B). P. Denis. Ills. 4700 w. Gen Civ—Oct. 6, 1917. Serial, 1st part. Results of researches on the design of drills, cutting speeds, shape of tool, steel used, etc., etc.

**Turbine Blading**

The Deterioration of Curtis Rateau Turbine Blading (78561 N). A. Fenwick, with discussion. Ills. 35 pp. So Af Inst Engrs, Jl—March, 1917. Behavior of certain materials used in turbine blading.

**Varnish**

Reports of Sub-Committee IX and XI on Varnish and Paint Thinners (79507 N). 66 pp. Am Soc Test Mat—June, 1917. Results of tests.

**Wood**

The Status and Value of Farm Woodlots in the Eastern United States (78707 N). E. H. Frothingham. 43 pp. U S Dept Ag, Bul 481—May 11, 1917. Relation of the woodlot to agricultural development.

**Wrought Iron**

Report of Committee A-2 on Wrought Iron (79512 N). 15 pp. Am Soc Test Mat—June, 1917. Proposed tentative specifications for wrought-iron pipe; stay bolt iron; blooms and forgings.

## MEASUREMENT

**Air Flow**

Measuring the Flow of Compressed Air (74461 A). Thomas G. Estep, Jr. 1000 w. Iron Age—Nov. 9, 1916. Curve to facilitate calculation.

Flow of Air Through Orifices Against Back Pressure (75705). B. S. Nelson. Ills. 1600 w. Eng News—Jan. 4, 1917. Results of an attempt to find an empirical formula.

A Study in Air Measurements and Air Flow (79969 D). Arthur K. Ohmes. Ills. 2000 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Test results and comparison with theoretical results.

**Air Meters**

Designs for the Rand (77584). 1000 w. Times Eng Supp—Feb. 23, 1917. Design of air meters for the Rand plant.

**Balance**

A Simple and Accurate Balance for the Shop (75849 A). F. J. Schlink. Ills. 2500 w. Machy—Jan., 1917. Construction, use, and advantages.

**Brass**

Testing of Sheet Brass (79514 N). C. H. Davis. 30 pp. Am Soc Test Mat—June, 1917. Investigation to select a rapid and satisfactory method.

**Calculations**

The Simplifying of Engineering Calculations (77929 A). J. E. Smith. 1200 w. Mech Wld—March 23, 1917. Directions for preparing and using a chart.

**Calorimeter**

An Aneroid Calorimeter for Specific and Latent Heats (82050 B). Nathan S. Osborne. Ills. 30 pp. A S R E, Jl—Sept., 1917. Describes instrument designed for measurement of heats of a certain class of materials.

**Charts**

Chart for Selecting Rawhide Pinions (74280 A). N. G. Near. 1000 w. Machy—Nov., 1916. Method of making chart and its application.

**Checking Angles**

Checking Angles With Swedish Blocks (80829). H. B. Lewis. Ills. 1300 w. Am Mach—Aug. 30, 1917. Methods of checking by means of Johansson standard gage blocks.

**Circle**

Equations for the Elements of the Circle (77234 A). J. A. Kitts. 700 w. West Eng—March, 1917. Gives equations, and shows the application to problems of design.

**Clocks**

A Clock of Precision (77175 A). C. O. Bartrum. Ills. 2500 w. Engr—Feb. 16, 1917. Details of a master pendulum clock with an auxiliary, or slave clock.

**Compressed Air**

Graphic Solutions of Some Compressed-Air Calculations (79155 D). C.

W. Crispell. 1500 w. A I M E Bul—June, 1917. Monograms designed to simplify Calculations.

**Containers**

Report of Committee D-10 on Shipping Containers (79479 N). 10 pp. Am Soc Test Mat—June, 1917. Proposed specifications for canned foods boxes.

**Cost Chart**

Production Manager's Guide and Self-Scheduling Work (80854 A). Robert A. Endebrock. 1000 w. Machy—Sept., 1917. Chart of progress and cost.

**Drill Bits**

Comparative Tests of Hammer Drill Bits (80285 D). Carroll R. Forbes and Joseph C. Barton. Ills. 22 pp. A I M E, Bul—Aug., 1917. Investigation to determine what effect the shaping of the cutting edge has on the cutting speed and wearing qualities.

**Expansion**

A Length Comparator, for Determining Linear Coefficients of Expansion (75298 F). William L. De Baufre. Ills. 2500 w. Am Soc Nav Engrs, Jl—Nov., 1916. Construction and operation, with method of calculating.

**Flow**

Calculation of Flow of Steam Through Pipes (75199). Frederick N. Hatch. 1000 w. Elec Wld—Dec. 9, 1916. Graphical solution based upon a formula derived by George H. Babcock.

Formula for the Flow of Gases (75111 B). W. K. Lewis. 5000 w. Jl Ind & Eng Chem—Dec., 1916. Derivation of formulas.

The Flow of Air and Steam Through Orifices (74996 A). Herbert B. Reynolds. 2800 w. A S M E, Jl—Dec., 1916. Details of apparatus and tests. (Abstract.)

A Study of the Thin Plate Orifice (76540 A). V. R. Gage. Ills. 2000 w. Sib Jl Eng—Feb., 1917. Serial, 1st part. Measuring the flow of water; apparatus and tests.

**Flue Gases**

A Method of Determining the Density of Flue Gases (75654 A). Jas. Alex. Smith. Read before the Victorian Inst. of Engrs. Ills. 1000 w. Engng—Dec. 15, 1916. A mode of determining gas density by gauge reading.

Mono $CO_2$, $SO_2$, and O Recorders (75798). Ills. 1500 w. Power—Jan. 9, 1917. Details of instruments.

**Friction**

The Friction of Water in Iron Pipes and Elbows (79970 D). F. E. Giesecke. Ills. 1400 w. Am Soc Ht & Vt Engrs, Jl—July, 1917. Experimental results.

**Fuel**

Calorific Value of Gaseous Fuels (79434). 1400 w. Times Eng Supp—May 25, 1917. Types of calorimeter preferably employed.

**Fuel Sampling**

Fuel Valuation (77577). 2000 w. Times Eng Supp—Feb. 23, 1917. Testing of fuels, use of calorimeter, laboratory methods employed, liquid fuels, etc.

**Gages**

Profile and Indicating Gages (74279 A). Douglas T. Hamilton. Ills. 8800 w. Machy—Nov., 1916. Serial, 1st part. Types of gages working on the automatic indicating principle are described in this article.

Gages for Time-Fuse Parts (80254 A). Donald A. Baker. Ills. 5000 w. Machy—Aug., 1917. Problems in their manufacture and improved methods of solving them.

**Gas Density**

Effusion Method of Determining Gas Density (79954). Junius David Edwards. Ills. 27 pp. U S Bur Stds, Tech paper 94—June 20, 1917. Investigations; apparatus and methods used.

**Graphics**

Graphical Control on the Exception Principle for Executives (77762 A). Frank B. Gilbreth. Charts. 1700 w. A S M E, Jl—April, 1917. Information a chart system should afford; operation of the exception principle.

Polar Diagrams for Graphic Dynamics (78666 A). Diagram. 3000 w. Eng Rev—April 16, 1917. Serial, 1st part. General principles underlying familiar constructions.

Graphical Calculus (79158 B). Charles A. Ellis. 86 pp. West Soc Engrs, Jl—April, 1917. With special reference to shear, moment and deflection diagrams.

**Grinding**

Solution of Grinding Problems (79916 B). Sergio Bagnara. 2000 w. Eng & Min Jl—July 14, 1917. (Special.) Method for representing grinding work by curves.

**Hardness**

Hardness Tests for Metals (74887). 2000 w. Times Eng Supp—Oct. 27, 1916. Principal methods in use.

Report of the Hardness Tests Research Committee (75456 A). Read before Inst. of Mech. Engrs. Ills. 4500 w. Engng—Dec. 8, 1916. Serial, 1st part. Report of experiments made at the Nat. Phys. Laboratory by Dr. T. E. Stanton and R. G. Batson.

Mesure De La Dureté Par Pénétration D'Une Molette (79407 C + D). F. Robin. Ills. 2800 w. Soc Enc Ind Nat—Mar.-Apr., 1917. Research on method of determining hardness by penetration of a circular cutter or chisel.

**Heat Insulation**

Report on Heat-Insulating Materials (78421). Ills. 1800 w. Power—May 1,

1917. Results of tests by Sargent and Lundy, comparing with common firebrick.

**High Temperatures**

High Temperature Measurement With the Optical Pyrometer (80894 A). W. E. Forsythe. Ills. 3500 w. Gen Elec Rev Sept., 1917. Methods and their practical utility.

**Impact**

Stresses in Impact (75343 B). Armin Elmendorf. Ills. 3500 w. Frkn Inst, Jl —Dec., 1916. Investigations.

**Impact Tests**

Impact Tests and Their Relation to Others (78479). Howard J. Stagg, Jr. 4500 w. Bt Fc & Stl Pt—May, 1917. Comparison of results from various types of machines.

**Impact Tube**

The Impact Tube (74316 A). Sanford A. Moss. Ills. 5000 w. A S M E, Jl—Nov., 1916. Abstract. Applications, particularly relating to compressible fluids.

**Indicator Diagrams**

A Study of the Compressor Indicator Diagram (74604 N). F. W. Lucht, Jr. 1000 w. Col Sl Min Qr—July, 1916.

**Indicators**

Indicators (74296). Ills. 2500 w. Prac Eng, Chi—Nov. 1, 1916. Serial, 1st part. Knowledge of their operation and construction important.

**Integrating Machine**

A New Integrating Machine and Its Practical Uses (78709). Armin Elmendorf. Ills. 2000 w. Wis Engr—April, 1917. Function and operation.

**Irregular Figures**

Enlarging or Reducing Irregular Figures (79305 A). Diagrams. 1500 w. Mech Wld—May 25, 1917. Methods explaned and illustrated.

**Laboratory**

Features of Modern Standardizing Laboratory (80690). E. P. Peck. Ills. 2000 w. Elec Wld—Aug. 25, 1917. Details of laboratory of the Georgia Ry. & Power Co.

**Lubricants**

Report of Committee D-2 on Lubricants (79475 N). Ills. 14 pp. Am Soc Test Mat—June, 1917. Proposed tests.

**Lubricating Oil**

The Testing of Lubricating Oils (79242 A). Hugh K. Moore and G. A. Richter. Ills. 1500 w. Met & Chem Eng—June 15, 1917. Method and apparatus for testing under service conditions.

**Manograph**

The Hospitalier Carpentier Manograph (76043). D. W. Allison. Ills. 1000 w. Wis Engr—Dec., 1916. For accurate determination of the cycle fluctuation of cylinder pressures in the internal combustion engine.

**Measures**

Specifications and Tolerances for Weights and Measures and Weighing and Measuring Devices (74824). 40 pp. U S Bur Stats, Circ. 61—Nov. 13, 1916. Applications, classification, scales, etc.

**Metric System**

The Adoption of the Metric System in the United States (76971 A). 26 pp. Sci Mthly—March, 1917. Papers by Arthur E. Kennelly, William C. Wells, H. V. Arny, Fred R. Drake, Adolph W. Miller and George F. Kuntz, read at a conference of Am. Assn. for Adv. of Sci.

Decimal Coinage and the Metric System (78033 A). 3500 w. Elec Rev—March 23, 1917. Arguments favoring their adoption.

The Decimal System of Coinage, Weights and Measures (78568 A). Harry Allcock. 1800 w. Surv'r—April 20, 1917. Serial, 1st part. Favors the adoption.

The Metric System (79432). 3200 w. Times Eng Supp—May 25, 1917. Objections to its introduction into machine shops, and the reasons therefor. Also a communication from W. R. Ingalls.

"Shall Great Britain and America Adopt the Metric System?" (79983 N). 29 pp. Inst Min & Met, Bul—June 28, 1917. Discussion of W. R. Ingalls' paper.

Against the Compulsory Adoption of the Metric System (80625 A). H. Cunliffe. From paper before the Inc. Soc. of Inspec. of Weights & Measures. 2000 w. Surv'r—July 27, 1917. Obstacles to the change. Scientific and commercial considerations.

Why Force Us to Speak a Foreign Language? (80651). J. P. Brophy. 1500 w. Am Mach—Aug. 23, 1917. Viewpoint of an American manufacturer in regard to the metric system.

The Adoption of the Metric System (81384 A). 1700 w. Nature—Aug. 30, 1917. Advantages and disadvantages discussed from the English viewpoint.

The Metric-Equivalent Scheme (80833). F. A. Halsey. 1200 w. Am Mach—Aug. 30, 1917. Argument opposing the adoption of the metric system.

**Micrographs**

Report of Committee E-4 on Magnification Scales for Micrographs (79482 N). 4 pp. Am Soc Test Mat—June, 1917. Proposed tentative definitions and rules governing the preparation of micrographs of metals and alloys.

**Optical Indicator**

Researches Made Possible by the Autographic Load Extension Optical Indicator (78991 A). W. E. Dalby. Ills. 2200 w. Engr—May 11, 1917. Serial, 1st part. Lecture to the Inst. of Metals. Details of the instrument and its use.

**Permeameter**

A Permeameter for Magnetic-Mechanical Testing (76783). Frank P. Fahy. Ills. 2200 w. Elec Wld—Feb. 17, 1917. Construction and operating features of a device for measuring the permeability and hysteresis constants of steel.

**Photography**

Maintaining Photographic Standards (80565 B). Alfred B. Hitchins. Ills. 25 pp. Fkn Inst, Jl—Aug., 1917. Methods employed for the upkeep of the quality of light-sensitive materials. How speed readings are determined and their meaning.

**Pipe**

From Ore to Finished "National" Pipe (79344 A). N. C. Nicol. Ills. 10 pp. N. Y. Rd. Cb, Pro—May 18, 1917. Illustrated lecture.

**Planimeters**

Planimeter Theory (75422 A). G. B. Upton. 3500 w. Sib Jl Eng—Dec., 1916. Theory in explanation of the action.

**Plates**

Flat Plates (80697 A). C. C. Pounder. Ills. 1500 w. Mech Wld—Aug. 10, 1917. Serial, 1st part. Method of determining the strengths of the more common types.

**Pneumercator**

Pneumercator for Determining Contents of Holds (80571 A). Ills. 600 w. Engng—Aug. 3, 1917. An instrument for determining the draught of a ship in harbor or at sea; the cubical contents of a ship's hold or of any compartment containing liquids.

**Power Measurements**

The Use of Ton-Hand Units in Power Measurements (80804). K. A. Norrman. 1800 w. Power—Aug. 28, 1917. Explains the use of the kilowatt as a standard power unit and gives an outline of the improved system.

Höchstwerte der Leistungen und Drehzahlen bei Riemenscheiben und Zahnrädern (80756 B). W. Kummer. 1600 w. Schweiz Bau—Aug. 4, 1917. Efficiency of belts and of gears in terms of horse power and speed.

**Primers**

Metal Primer Tests (79487 N). H. A. Gardner. Ills. 7 pp. Am Soc Test Mat —June, 1917. Results of exposure tests made to determine what grade of pigment is best suited for use as a primer coat.

**Pumping Engines**

See same heading under CIVIL ENGINEERING, *Water Supply*.

**Pumps**

Liquid-Measuring Pumps (74588). F. J. Schlink. Ills. 25 pp. U S Bur Stds, No. 81—Oct. 27, 1916. Outlines points of value to the inspector of weights and measures, discussing types used in dispensing gasoline and oils.

**Pump Tests**

See same heading under CIVIL ENGINEERING, *Water Supply*.

**Pure Iron**

Thermo-Electric Measurement of the Critical Ranges of Pure Iron (74496 A). George K. Burgess and H. Scott. Ills. 1800 w. Engng—Oct. 20, 1916. Describes a sensitive method by means of which observations may be taken *in vacuo* at intervals of degrees.

**Pyrometers**

The Electric Pyrometer (76182). James Steelman. Ills. 3500 w. Brs Wld—Jan., 1917. Serial, 1st part. Considers types.

**Pyrometry**

Pyrometers of the Past, Present and Future (80248 A). Abstract of paper by Richard P. Brown. 2500 w. Machy—Aug., 1917. Reviews devices for measuring temperature of furnaces, their limitations and considers possible future developments.

La Mesure Des Températures Élevées (80053 B). H. Le Chatelier. 4200 w. La Nat—July 14, 1917. Review of modern methods of measuring high temperatures.

**Resilience**

The Resilience Test (81311 A). Henry M. Howe. 2500 w. Met & Chem Eng—Sept. 15, 1917. Critical discussion of methods of testing.

Impact Tests and the Determination of Resiliency (81515 A). Georges Charpy and André Cornu-Thenard. Trans. from *Revue de Met.* Ills. 6500 w. Met & Chem Eng—Oct. 1, 1917. Report of research work.

**Riveted Joints**

The Partition of Load in Riveted Joints (74674 B). Cyril Batho. Ills. 50 pp. Fkn Inst, Jl—Nov., 1916. Theory and experiments.

**Scales**

Industrial Scales and Weighing (78331 A). Herbert T. Wade. Ills. 7000 w. Ind Man—May, 1917. Concluding chapter of a serial considers large industrial scales and railway track scales.

**Screw Pump**

Proefnemingen met een watervijzel (75605 B). J. C. Horch. Ills. 3300 w. Ingr—Dec. 2, 1916. Tests of motor driven screw pump and deduction of results.

**Screw Threads**

Screw Thread Measurement (76843 A). Arthur Brooker. Ills. Read before Liverpool Engng. Soc. 4500 w. Engng—Feb. 2, 1917. Serial, 1st part. Considers the Whitworth Standard Thread, methods of measurement, etc.

Further Notes on Screw Threads (78205 A). W. C. Unwin. 1200 w. Engng—March 30, 1917. British standard fine threads; international metric thread.

Screw Thread Measurement (78662 A). Arthur Brooker. Ills. 4000 w. Mech Engr—May 4, 1917. Serial, 1st part. History of the standardization of screw threads; methods of measurement, etc.

**Shaft H. P.**

Measuring Shaft Horsepower of Destroyers (81155 F). F. W. Sterling. Ills. 3500 w. Am Soc Nav Engrs, Jl—Aug., 1917. The Gary-Cummings torsion meter and its use and care.

**Shafts**

On the Critical Speeds of Loaded Shafts (81718 A). W. M. Wallace. 2200 w. Engr—Sept. 21, 1917. Experiments to examine the accuracy of various simple methods of determining the whirling speed of a shaft of variable section, and the effect of bearing clearance.

**Shock Tests**

Nouvelles Expériences Sur Les Essais De Choc (80725C + D). G. Charpy and A. Cornu-Thénard. Ills. 8000 w. Rev Met—Mar.-April, 1917. Results of new shock tests and determination of resiliency of various alloy steels.

New Experiments on Shock Tests and on the Determination of Resilience (81598 N). Georges Charpy and André Cornu-Thenard. Ills. 44 pp. Ir & St Inst—Sept., 1917. Researches to determine the method to be adopted in carrying out resilience tests.

**Shutter Testing**

A Shutter Testing Machine (76199 B). Alfred B. Hitchins and F. B. Gilbert. Ills. 900 w. Fkn Inst, Jl—Jan., 1917. Details of instrument for testing the speed and efficiency.

**Slide Rules**

A Note on the Solution of Equations by Means of the Slide-Rule (81197 N). Edward William Hollingworth. Ills. 900 w. Instn C E—No. 4163. Methods explained.

Design of Special Slide Rules (82100 A). A. Lewis Jenkins. Ills. 3000 w. Ind Man—Nov., 1917. Serial, 1st part. Laying out slide rules for solving all kinds of equations.

**Standardization**

International Standardization (80151 A). Editorial. 1000 w. Ind Man—Aug., 1917. Importance of standardizing all gages, screw threads, pipe sizes, etc., for all nations, and its bearing on commerce after the war.

**Standards**

The National Bureau of Standards (80839 B). Ills. 5000 w. S A E, Jl—Aug., 1917. Brief review of the activities of the Bureau.

**Steel Tests**

Endurance Tests on Steel (80383 A). W. C. Popplewell. 3500 w. Eng Rev—July 16, 1917. Results of endurance experiments by means of tests made on a testing machine.

**Stresses**

Combined Stresses (80336 A). A. Lewis Jenkins. 3000 w. A S M E, Jl—Aug., 1917. Possible hypotheses upon which a formula for combined stresses may be based.

Ductile Materials Under Variable Shear Stress (80433 A). R. W. Bailey. 3500 w. Engng—July 27, 1917. Their behavior, with special reference to shafts subjected to bending and twisting.

Stress Determination in a Flat Plate (80393 A). J. Montgomerie. Ills. 1700 w. Engng—July 13, 1917. Serial, 1st part. Results of tests.

Stresses in Rotating Discs with a Hole at the Centre (80568 A). W. Knight. 1000 w. Engng—Aug. 3, 1917. Relatively simple formulas for the determination of stresses in such discs. Graphical representation.

**Tachometers**

Integrating Tachometers (79188 F). L. A. Kaiser. Ills. 1800 w. Am Soc Nav Engrs, Jl—May, 1917. Details of types.

**Test Bars**

Some Test Bar Suggestions for Nonferrous Metal (80267). Charles Vickers. Ills. 4500 w. Fndry—Aug., 1917. How satisfactory test bars for various alloys may be cast.

**Testing**

Devices Used for Testing Typewriter Type (80649). Frank A. Stanley. Ills. 2500 w. Am Mach—Aug. 23, 1917. Serial, 1st part. Gages and special fixtures used in testing for alignment, correct position, accuracy of fitting and line uniformity.

**Testing Machines**

What Our Large Testing Machines Have Accomplished (78347). T. J. Mosley and J. H. Griffith. 3500 w. Eng News-Rec—April 26, 1917. Machines of Bureau of Standards, of unusual capacity and precision.

An Alternating Torsion Testing Machine (79502 N). D. J. McAdam, Jr. Ills. 3 pp. Am Soc Test Mat—June, 1917. Improvements introduced.

**Testing Sieves**

A Standard Screen Scale for Testing Sieves (79151 D). 9 pp. A I M E, Bul—June, 1917. Recommended for general adoption.

**Thermometers**

Some Sources of Error in Thermometry (75971 A). E. B. Pausey. Ills. 3000 w. Elec Rev—Dec. 29, 1916. Sources of error explained.

Installation of Thermometers (76398). W. A. Tailer. 3000 w. Nat Engr—Feb., 1917. Selection according to service needs; methods of testing, and general remarks on observing.

**Torsion**

The Torsion of Solid and Hollow Prisms and Cylinders (75228 A). Cyril Batho. 1700 w. Engng—Nov. 24, 1916. Serial, 1st part. Considers thin-walled cylinders or prisms having a continuous boundary; extends method and develops formulæ, etc.

**Turbines**

The Williams Line for Steam Turbines (75397 A). 1500 w. Engng—Dec. 1, 1916. A study.

**Viscosity**

Determination of Absolute Viscosity by the Saybolt Universal and Engler Viscosimeters (79484 N). Winslow H. Herschel. 17 pp. Am Soc Test Mat—June, 1917. Shows that all equations are in error which have been based upon tests with water.

**Weighing**

Scales and Weighing Methods in Industrial Establishments (76269 A). Herbert T. Wade. Ills. 3500 w. Ind Man Feb., 1917. Serial, 1st part. Methods and machinery in present use.

Weighing Coal at Power Plants (76154). Henry J. Edsall. Ills. 2800 w. Power—Jan. 23, 1917. The value of coal-weighing machines. Operation.

Scales and Weighing Methods in Industrial Establishments (76964 A). Herbert T. Wade. Ills. 7500 w. Ind Man—March, 1917. Second part of a serial. Design, construction, operation, and test of scales of moderate capacity.

Decimal Weights, Measures, and Coinage (76696 A). Edward C. Barton. 3000 w. Surv'r—Jan. 26, 1917. Favoring change to the metric system.

Scales and Weighing Methods in Industrial Establishments (77618 A). H. T. Wade. Ills. 6000 w. Ind Man—April, 1917. Machinery and methods of accomplishing results. Third article of a series.

See also Money System, under INDUSTRIAL MANAGEMENT, *Finance and Costs.*

**Weighing Devices**

Knife-Edge Materials and Stresses (80060). H. L. Van Kuren. Ills. 1500 w. Ry Age Gaz—July 20, 1917. Requirements of the knife-edges of track scales.

**Weir Meters**

Weir Meters for the Power Plant (78419). Ills. 2500 w. Power—May 1, 1917. Devices for translating head directly into flow.

**Wind Resistance**

Wind Resistance as Affecting the Motion of a Train (81276 A). H. C. Webster. Diagrams. 800 w. Ry Engr—Sept., 1917. Curves showing wind effects, with explanatory notes.

## POWER AND TRANSMISSION

**Air**

The Physical Properties of Air in Relation to Practical Problems (76587 A). H. Eisert. 3000 w. E Cb Balt, Jl—Feb., 1917. Serial, 1st part. Properties of air in their relation to its most important uses.

**Air Compression**

Notes on Air Compressor Design (80082 A). W. C. Popplewell. Ills. 1800 w. Mech Wld—July 6, 1917. Serial, 1st part. Points to be considered in order to secure economical operation, etc.

**Air Compressors**

High-Pressure Air-Compressors (74497 A). Joseph M. Ford. Read before the Greenock Assn. of Shipbldrs & Engrs. Ills. 3500 w. Engng—Oct. 20, 1916. Serial, 1st part. Deals with machines which produce high-pressure air.

Some Notes on Belting (74586). Frank Richards. Ills. 2000 w. Prac Engr, Chi—Nov. 15, 1916. Proper side of belt to use; tension; short drives.

The Care of Leather Belting (74749). 1500 w. Power—Nov. 21, 1916. Low cost and dependability obtained only by careful installation and upkeep.

The Hydraulic Air-Compressor (75389). A. E. Chodzko. Ills. 3500 w. Min & Sci Pr—Dec. 16, 1916. Technical description.

The Hydraulic Air-Compressor (77235 A). A. E. Chodzko. Ills. 4000 w. West Eng—March, 1917. Technical description of system.

Safe Air - Compressor Operation (78029). M. A. Saller. 1800 w. Power—April 17, 1917. Instructions regarding safe operation.

Notes on Compression and Transmission of Air (79197). Robert S. Lewis. 3500 w. Min & Sci Pr—June 9, 1917. Principles of air-compression; development of formulae; calculations, etc.

Notes on Compression and Transmission of Air (79795). Robert S. Lewis. 3500 w. West Eng—July, 1917. Principles; formulæ; calculation by chart; data required, etc.

Portable Air Compressor Set (80435 A). Ills. 500 w. Engng—July 27, 1917. Compact and practically noiseless.

**Belts**

Some Interesting Figures on Slack Belts (75419). W. F. Schaphorst. 800 w. Brs Wld—Dec., 1916. Shows how the arc of contact increases with slackness.

Specifications for Leather Belting (80830). Louis W. Arny. 2200 w. Am Mach—Aug. 30, 1917. Mistakes in the usual methods of selecting belting and a scheme to secure reliable information.

**Canada**

Power for the Farm in Canada (80391 A). 1500 w. Engng—July 13, 1917. The position of the farmer and the cost of power.

**Compressed Air**

Efficiency of Compressed-Air Installations (75354). Theodore Simons. 3000 w. Eng & Min Jl—Dec. 16, 1916. Serial, 1st part. Losses described and suggestions for higher efficiency given.

Compressed Air for Pumping and Agitation (76747). Charles C. Phelps. Ills. 1500 w. Prac Eng, Chi—Feb. 15, 1917. Details of plant at Ladew tannery.

Compressed Air (78329 A). Charles L. Hubbard. Ills. 7000 w. Ind Man—May, 1917. First of a series. General principles. Performance of compressors.

Compressed Air (78893 A). Charles L. Hubbard. Ills. 8000 w. Ind Man—June, 1917. Second part of a serial, considering production and compressors.

Compressed Air—Its Application to Various Industries (79563 A). Charles L. Hubbard. Ills. 6000 w. Ind Man—July, 1917. Appliances and methods for use of compressed air in mining, quarrying, etc.

Compressed Air Plant in Tunnel and Caisson Work (79003). Charles L. Hubbard. Ills. 1500 w. Nat Engr—June, 1917. Describes modern equipment

**Compressors**

Modern Compressor Equipment Paid (78176). Stephen W. Symons. Ills. 1500 w. Cl Age—April 21, 1917. One modern air compressor did the work of nine old machines, effecting savings.

**Corrosion**

Corrosion About the Power Plant (79048). H. J. Macintire. Ills. 2000 w. Power—June 5, 1917. Explains how corrosion attacks steam and water piping; action of brine in refrigerating system, and how to minimize corrosion

**Cotton Ropes**

Cotton Rope for Power Transmission (79827 B). J. Melville Alison, with discussion. Ills. 30 pp. Engr Soc W Penn, Pro—June, 1917. Rope drives, and cotton vs. Manila as a material, and a scientifically constructed rope for this service. Comparisons.

**Countershaft Speeds**

Effect of Countershaft Speed Ratio on Power and Torque (79902). A. Lewis Jenkins. 1500 w. Am Mach—July 12, 1917. Study of two combinations of countershaft speeds for a cone-driven machine.

**Economy**

Economy of Coal in Power Production (75129 A). C. E. Stromeyer. 3000 w. Mech Engr—Nov. 24, 1916. From memorandum of Chief Engineer of Manchester Steam Users' Assn. for 1915. Opportunities for improvement.

**Elevators**

Safety Devices for Elevators (75799). Jacob Gintz, Jr. Ills. 900 w. Power—Jan. 9, 1917. Construction and function of the potential switch and safety devices.

Mechanically Operated Electric Elevator Controller (78420). J. Gintz, Jr. Ills. 1500 w. Power—May 1, 1917. Functions and circuits explained.

Electric Elevator Maintenance (78941). H. J. Geake. 2200 w. Prac Eng, Chi—June 1, 1917. Suggestions for the prevention and remedy of troubles.

Elevators (80211). Charles W. Naylor. 3000 w. Natl Engr—Aug., 1917. Magnitude of passenger traffic; service safety; costs, care, etc.

**Engineering Laboratories**

Technology's Laboratories and Power Plant (77255). Charles H. Bromley. Ills. 2000 w. Power—March 13, 1917. Chief features of equipment of plant of Mass. Inst. of Technology.

**Equalizers**

Flywheel Load Equalizers (80376 A). M. J. E. Tilney. 1500 w. Elec'n—July 20, 1917. Details of tests.

**Explosion**

Economizer Explosion Explained (79200). Ills. 800 w. Power—June 12, 1917. Analysis of accident.

**Farm Power**

Mechanical Power on the Farm (77159 A). Ills. 2000 w. Autocar—Feb. 17, 1917. Machines employed, their merits, etc.

**Friction**

Modern Friction Surfaces (75659 A). John Oswald. Read before Assn. of Min.

Elec. Engrs. Ills. 1800 w. Ir & Cl Trds Rev—Dec. 15, 1916. The use of fabric linings and suggestions for material to use on different classes of machinery.

Modern Friction Surfaces (76375 A). G. Oswald. 2000 w. Mech Engr—Jan. 19, 1917. Read before Assn. of Min. Elec. Engrs. The use of fabric linings.

**Gas Power**

Gas Power Session (75857 A). 4000 w. A S M E, Jl—Jan., 1917. Topical discussion.

Gas Power Papers (78465 A). Ills. 13 pp. A S M E, Jl—May, 1917. Engine design and regulation. Papers by C. E. Lucke, H. Judd, J. Younger and J. R. Du Priest.

**Grain Elevators**

Power Plant Calumet Terminal Elevator (81865). Thomas Wilson. Ills. 2200 w. Power—Oct. 16, 1917. New turbine plant for the largest single grain elevator in the world.

**Heat Engines**

Vapors for Heat Engines (76016 B). William D. Ennis. 3500 w. Stev Indic —Oct., 1916. Possibilities in connection with the use of vapor engines.

**History**

Old and New in Engineering (80886). R. H. Holbrook. 5000 w. Natl Engr—Sept., 1917. From inventors of 17th and 18th centuries down to the modern steam turbine.

**Hospital**

Serving the Sick (81797). Ills. 3000 w. Prac Eng, Chi—Oct. 15, 1917. Duplicate equipment in power plant of Mercy Hospital, Chicago.

**Hotel Plant**

Power Plant of Hotel Traymore (75829). Walter C. Edge. Ills. 2000 w. Nat Engr—Jan., 1917. Equipment.

**Intercooling**

Intercooler Efficiencies (77976). Frank Richards. 1500 w. Com Air—May-April, 1917. Importance of water jacketing; moisture effects, etc.

**Isolated Plant**

Engineering Equipment of a Modern Printery (78940). Ills. 1800 w. Prac Eng, Chi—June 1, 1917. Isolated plant of The Henneberry Co., Chicago, which shows profit.

**Italy**

Impianti Di Accumulazione Di Energia (78853 B). Ills. 2400 w. Ind—Apr. 15, 1917. Various Italian systems of developing and transmitting power of water.

**Leather**

Tannage Rapide et Ultra-Rapide (76258 B). N. Flamel. 4100 w. Rev Gen Sci—Dec. 30, 1916. Effect on leather of different rates of tanning. Methods.

**Loads**

Electric and Steam Service for Buildings (75493). W. P. Whittington. Read before Ohio new business committee. 3000 w. Elec Rv & Wes Elec—Dec. 23, 1916. Proper analysis of electric and steam requirements of large buildings.

**Lubrication**

Graphite Cylinder Lubrication (75875 A). E. W. Johnston. Abstract of paper before the Birmingham Assn. of Mech. Engrs. 3000 w. Mech Engr—Dec. 22, 1916. The writer's experience in the use of "Aquadag."

Lubrication of Cutting Tools (75842 A). Edward K. Hammond. Ills. 19 pp. Machy—Jan., 1917. Serial, 1st part. Characteristics and uses of oils and compounds for cooling and lubricating cutting tools.

Lubrication (76376 A). W. H. Reay. 3000 w. Mech Engr—Jan. 19, 1917. Lubricants and methods of applying them to secure satisfactory results.

Reducing Friction by Automatic Lubrication (77759 A). J. William Peterson. 3500 w. A S M E, Jl—April, 1917. Cylinder and bearing lubrication and scientific methods.

Principles of Lubrication (79654). S. S. Ledbetter. 4500 w. Nat'l Engr—July, 1917. Properties of oil and other lubricants, tests, impurities, etc.

The Lubrication of Gears (79794). H. R. Smith. 1200 w. Power—July 10, 1917. Systems of lubrication, and the selection of lubricants.

Economy in Lubrication (80227). A. J. Dixon. 1200 w. Power—July 31, 1917. Suggestions.

Lubrication (80848 A). 2000 w. Machy—Sept., 1917. Importance of study of lubrication. Its effect on mechanical efficiency, etc.

**Piping**

Compressed Air Piping (75821 B). Ills. 2800 w. Prac Eng, Chi—Jan. 1, 1917. Transmission and distributing piping, etc.

**Power**

Is Not Gas Power Cheaper Than Water Power? (77735 A). H. G. H. Farr. 1800 w. Met & Chem Eng—April 1, 1917. Data of what is being done in England and Europe to increase the supply of nitrate. The by-products gas producer.

Power Production and Distribution at Pullman Shops (80257). Ills. 1000 w. Elec Rev & Wes Elec—July 28, 1917. Power equipment for eleven large shops.

**Power Plants**

Reorganization of a Paper Mill Power Plant (75984 A). Ills. 1200 w. Engr—Dec. 29, 1916. New power house at Polton, Midlothian.

The Ford Engine Room (75966). Thomas Wilson. Ills. 4000 w. Power—Jan. 16, 1917. Details of composite gas-steam engine standard in Ford plants.

Ford Boiler and Gas Plants (76806). Thomas Wilson. Ills. 3000 w. Power—Feb. 20, 1917. To contain 7 and probably 11 of the largest boilers in this country.

General Mechanical Equipment of the William Penn Hotel, Pittsburgh, Pa. (76726). Ills. 8000 w. Ht & Vt Mag—Feb., 1917. Details of plant to meet modern hotel requirements.

Power-Plant Efficiency (76469 A). 2000 w. A S M E, Jl—Feb., 1917. Discussion of Victor J. Azbe's paper, with closure.

Telephone and Telegraph Building Steam-Power Plant (78542). Warren O. Rogers. Ills. 2000 w. Power—May 8, 1917. Office-building plant having features out of the ordinary.

Columbia Western Mills Power Plant (79002). Thomas G. Thurston. Ils. 3000 w. Nat Engr—June, 1917. Details of a Chicago plant.

Lovell Mfg. Co.'s Power Plant (79287). Ills. 1200 w. Prac Eng, Chi—June 15, 1917. Synchronous condenser improves power factor. Sawdust forms part of fuel supply.

Wastes in the Small Boiler Room and the Remedy (79453 A). C. T. Baker. 1700 w. Ind Man—July, 1917. How the efficiency of a small power plant may be increased by the installation of modern equipment

Office Building Power Plant (79656). Paul Steurmer. 4000 w. Nat'l Engr—July, 1917. Outline for determining the required equipment. Read before N. A. S. E. of Chicago.

Modern Plant for Kimball Building (79876). Ills. 2500 w. Prac Eng, Chi—July 15, 1917. High-pressure boilers, mechanical handling of coal and ashes, general arrangement, etc.

Operating Engineer in Power Plant Construction (80213). Frank W. Laas. 1000 w. Natl Engr—Aug., 1917. Three factors to be considered when installing a power plant.

Power Plant Vibrations (81844 A). J. F. Porter. Ills. 2000 w. Mech Wld—Sept. 28, 1917. Causes outlined and remedies discussed.

Appleton Water-Steam Plant (81536). Thomas Wilson. Ills. 3500 w. Power—Oct. 2, 1917. Low-head water plant and modern high-pressure system aranged on the unit plan.

**Review**

Year's Review of the Power Field (75694). 7000 w. Power—Jan. 2, 1917. Progress, notable plants, legislation, improved methods, etc.

**Rolling Mills**

Rolling Mill Power Requirements (80347). F. Denk. Ills. 1800 w. Bt Fc & St Pt—Aug., 1917. Difficulties encountered in the derivation of formulæ, experiments, etc.

**Steam Plants**

Graphic Methods of Analysis in the Design and Operation of Steam Power Plants (74995 A). R. J. S. Pigott. 2500 w. A S M E Jl—Dec., 1916. Considers application of graphic methods.

**Steel Band Drive**

Magnetic Steel Band Drive (81166 N). P. L. Weston. Read before Elec. Assn. of Aust. Ills. 3500 w. Comwh Engr—Aug. 1, 1917. Merits and limitations of the plain band drive, with results of tests.

**Sugar Plantation**

Mechanical Equipment of a Hawaiian Sugar Plantation (79901). Ills. 1500 w. Am Mach—July 12, 1917. Detailed description.

**Valves**

Pressure Reducing and Regulating Valves (80509). J. C. Hawkins. Ills. 3000 w. Power—Aug. 14, 1917. Advantages of reducing valves, and methods of piping.

**Vibration**

The Prevention of Vibration in an Apartment House (75695). Ills. 1200 w. Power—Jan. 2, 1917. Trouble overcome by changes in piping and installing shock and sound arresters.

Vibration in Textile-Mill Buildings (76464 A). G. H. Perkins. 2500 w. A S M E, Jl—Feb., 1917. Causes and effects.

**Water Power**

Waters and Water-Powers (74395). Leo G. Denis. 1800 w. Can Engr—Nov. 2, 1916. Résumé of development from 7th Annual Report of Com. of Conservation.

The Future of Water Power in the United States (76304 D). Charles W. Comstock. 12 pp. A I E E, Pro—Jan., 1917. Statistics, and possibilities of water power development.

Water-Power Development (77266). Henry Sturgis Drinker. 9 pp. Gov. Printing Office—Senate Doc. No. 697—Jan. 19, 1917. Position of engineers toward the question of water-power development in the West.

Canadian Water Powers (77237 A). Ills. 2000 w. Elec Rev—Feb. 23, 1917.

Review of a recent government publication describing the developed and undeveloped water powers.

Coal Supplies v. Water Power (78572 A). 2000 w. Colly Gdn—April 13, 1917. From recent report of the Dominion Royal Commission. Water powers of Canada, Australia, New Zealand, and Newfoundland.

Water Power in Canada (79732 A). 2500 w. Engng—June 15, 1917. Editorial review of a recent work by Charles H. Mitchell on "Canadian Hydraulic Power Development and Electric Power in Canadian Industry."

**Wind-Wheels**

Some Novel Experiments With Wind-Wheels (79131 A). Thomas O. Perry. Ills. 2000 w. Mich Tech—May, 1917. Details of tests.

## STEAM ENGINEERING

**Air Pumps**

De lucht-ejecteur systeem Westinghouse-Leblanc (75556 B). N. C. H. Verdam. Ills. 8500 w. Ingr—Nov. 18, 1916. Westinghouse-Leblanc air pumps by European builders and their use on steamships.

**Boiler Code**

Revision of Boiler Code (79083 A). 5000 w. A S M E, Jl—June, 1917. Portions subject to revision.

**Boiler Control**

Station Operation (75068). Ills. 2500 w. Prac Eng, Chi—Dec. 1, 1916. Boiler switchboard for efficiency control.

Importance of Flexibility of Boiler Control (81921). Victor B. Phillips. 2500 w. Elec Wld—Oct. 20, 1917. Separate and flexible air control a means toward securing maximum efficiency over wide range of loading.

**Boiler Efficiency**

Boiler Efficiency (82035). 2000 w. Times Eng Supp—Sept. 28, 1917. Results of experiments on the transfer of heat through boiler plates. Effects of scale, soot, etc.

**Boiler Energy**

Energy Stored in a Boiler Under Pressure (77900). F. R. Low. Ills. 3000 w. Power—April 10, 1917. Methods of computing energy that would be released by an exploding boiler.

**Boiler House**

Boiler-House Design (80816 A). Herbert E. Birch. Ills. 4000 w. Ind Man—Sept., 1917. Serial, 1st part. Comparison of plans, showing arrangement of coal bunkers, conveyors, and other auxiliaries.

Boiler House Design (81443 A). Herbert E. Birch. Ills. 3500 w. Ind Man—Oct., 1917. Second article of a serial on design of coal and ash-handling appliances.

**Boiler-House Operation**

Boiler-House Operation and Maintenance, with Special Reference to the Rand Power Companies Plant (76686 N). T. G. Otley and Verney Pickles. Ills. 32 pp. So Af Inst Engrs, Jl—Jan., 1917. Methods adopted and efficiencies obtained.

**Boiler Joints**

Efficiency of Unsymmetrical Riveted Joints (74436). H. J. Vander Eb. Ills. 2000 w. Power—Nov. 7, 1916. Reply to R. N. Blackburn's criticisms in issue of Aug. 8.

**Boiler Plants**

Chain of Rocks Remodeled Boiler Plant (80508). H. F. Gauss. Ills. 2200 w. Power—Aug. 14, 1917. Serial, 1st part. Complete remodeling of eight water-tube boilers. Interesting features introduced.

New Armour Boiler Plant (79680 A). Thomas Wilson. Ills. 2200 w. Power—July 3, 1917. A modern installation of 4,000 h. p.

The Failure of Boiler Plates in Service, and Investigations of the Stresses that Occur in Riveted Joints (81603 N). E. B. Wolff. Ills. 22 pp. Ir & St Inst—Sept., 1917. Research work to find the causes of the cracking of boiler plates over the riveted seams.

**Boiler Rooms**

Reducing Labor and Increasing Efficiency in Boiler Rooms (81114). J. H. Edsall. Ills. 5000 w. Elec Rev & Wes Elec—Sept. 15, 1917. On the economies of coal and ash-handling equipment.

**Boilers**

Boiler Settings Under Different Conditions (75201). Ills. 900 w. Elec Wld—Dec. 9, 1916. Convenient arrangements with different types of boilers and under different conditions.

The Talbot Boiler (75005 A). Paul A. Talbot. Ills. 2500 w. A S M E, Jl—Dec., 1916. Construction, operation, control, etc. (Abstract.)

Notes on the Winslow Safety High Pressure Boiler (74616 D). Robert Cramer. Ills. 2000 w. O S M E S E, Jl—Vol. IX, No. 1. Details of design.

Power Equipment for Steam Plants (74952 A). Robert L. Streeter. Ills. 4500 w. Ind Man—Dec., 1916. Outlines historical development, giving résumé of modern types. Fourth article.

The Testing of House-Heating Boilers (74313 A). L. P. Breckenridge and D. B. Prentice. Abstract. 2000 w. A S M E, Jl—Nov., 1916. A standard method for testing.

Water for Steam Boilers—Its Significance and Treatment (74315 A). Arthur C. Scott and J. R. Bailey. 2500 w. A S M E, Jl—Nov., 1916. Abstract. Boiler troubles, their causes and remedies. Scale and corrosion.

Steam Boiler Session (75858 A). 3500 w. A S M E, Jl—Jan., 1917. Topical discussion.

Waste-Heat Boilers Make Good Record (75723 D). Ills. 2500 w. Iron Age—Jan. 4, 1917. Special No. Details, and successful operation in Chicago.

Boiler Efficiency (76920). 2400 w. Times Eng Supp—Jan. 26, 1917. General considerations as to heating surface arrangement, kind of tubes, flue gas retarders, etc.

Higher Boiler Pressures—Opinions of Distinguished Engineers (76661). Ills. 5000 w. Power—Feb. 13, 1917. Views on the possibilities and limitations of such pressures.

Tight-Boiler Settings (76397). R. T. Strohm. 1500 w. Nat Engr—Feb., 1917. Effect of air leakages and the remedies.

The Downflow Type of Steam Boiler (76992 A). John Clinton Parker. Ills. (Abstract.) 1200 w. A S M E, Jl—March, 1917. Detailed description.

Discussion of Paper on Strength of Boiler Furnaces by John Airey (77309 F). H. J. Vander Eb. 1500 w. Am Soc Nav Engrs, Jl—Feb., 1917.

Water for Steam Boilers—Its Significance and Treatment (76993 A). 3000 w. A S M E, Jl—March, 1917. Discussion of paper of Arthur C. Scott and J. R. Bailey.

Insulation of Boiler Settings (77664). Joseph Harrington. 3300 w. Power—March 27, 1917. Different types employed, with results from tests.

Oil-Fired Naval Boiler (78206 A). Plates. 700 w. Engng—March 30, 1917. Marine water-tube boiler pitted with Kermode's pressure-jet system for burning oil fuel.

Boiler Efficiency (78284). 1800 w. Times Eng Supp—March 30, 1917. Reviews of modern practice with different types of boilers. General considerations, with résumé.

High Rate Heat Transmission Through Externally and Internally Extended Surfaces of High Duty Steam Boilers (79195 B). Enoch Rector. Ills. 2500 w. Am Soc Ref Engrs, Jl—May, 1917. Test of thermo-plug steamer boiler.

Getting Up Steam in the Scotch Marine Boiler (80363). Charles H. Bromley. Ills. 1000 w. Power—Aug. 7, 1917. Precautions necessary.

Heine Boiler Construction (80540). Ills. 1800 w. Prac Engr, Chi—Aug. 15, 1917. Details of drum and water leg design, etc.

Manning Boiler Construction (80215). Ills. 1500 w. Prac Eng, Chi—Aug. 1, 1917. Details of design and operation of upright fire-tube boiler.

The Down Draught Smokeless Boiler (80531 A). A. Bement. 2000 w. Colly Gdn—July 27, 1917. Theory and advantages; proper firing, etc.

The Stevens-Pratt Boiler (80617). Ills. 1000 w. Power—Aug. 21, 1917. Proposed boiler consisting of four sections with total capacity as high as 5760 nominal rated horse-power.

Design and Construction of Loco Multitubular Boilers (81319 A). W. H. Grantham. Ills. 1200 w. Mech Wld—Sept. 7, 1917. Serial, 1st part. Considers only the loco-type boilers as used for traction, portable, and small fixed engines, but not for locomotive engines.

European Experiences With Stirling Boilers (80845). B. N. Broido. Ills. 2500 w. Prac Eng, Chi, Sept. 1, 1917. Details concerning their manufacture and operation.

Babcock & Wilcox Boiler Construction (81500). Ills. 1500 w. Prac Eng, Chi—Oct. 1, 1917. Pressure parts and setting; methods employed for replacing tubes and baffles.

New Boilers for Ashley Street Station (81674). John Hunter. Ills. 1800 w. Power—Oct. 9, 1917. Extensive changes in the boiler plant building and equipment to install additional boiler capacity for driving new 25,000-kv.-a turbines.

**Boiler Scale**

Keeping Boilers Free From Scale (77732 A). W. R. Starr. 1800 w. Mar Rev—April, 1917. How graphite is used to eliminate scale.

**Clinkers**

Formation of Clinkers in Boiler Furnaces (76654). Albert A. Cary. 2000 w. Elec Wld—Feb. 10, 1916. Analysis of combustion conditions, and suggestions.

**Coal Storage**

See same heading under Mining and Metallurgy, *Coal and Coke.*

**Combustion**

Excess Air in Fuel Combustion (74584). Morgan B. Smith. Ills. 1300

w. Power—Nov. 14, 1916. Shows fuel losses due to excess air.

Combustion in the Fuel Bed of Hand-Fired Furnaces (77362). Henry Kreisinger, F. K. Ovitz, and C. E. Augustine. Ills. 65 pp. U S Bur Mines—Tech paper 137. Investigation to determine conditions governing the process.

Thermal Efficiency (77192 A). A. B. Carpenter. 1200 w. (Abstract.) Ice & Refrig—March, 1917. Causes of loss in combustion of fuel under boilers.

Combustion of Bituminous Coals (77792). Henry Kreisinger. Ills. 3000 w. Natl Engr—April, 1917. Serial, 1st part. Combustion of bituminous coal under power-plant boilers.

Pounds of Air per Pound of Coal (78221). Victor J. Azbe. Ills. 1000 w. Power—April 24, 1917. Suggests that "pounds of air per 10,000 B. t. u." be substituted.

**Compression**

Compression from a Mechanical Point of View (74583). F. R. Low. Ills. 3000 w. Power—Nov. 14, 1916. How the indicator diagram may be modified to show inertia and momentum effects.

**Condensers**

A Hint for Designing Condensers (76121 A). W. C. A. Sieverts. Curves. 2200 w. Am Soc Mar Drfts, Jl—Jan., 1917. Factors governing the maximum vacuum.

Condenser Efficiencies (75968). John D. Morgan. 800 w. Power—Jan. 16, 1917. General discussion; particularly in connection with capacity and economy.

Condensers (75813 B). Ills. 1800 w. Prac Eng, Chi—Jan. 1, 1917. Arrangements and connections for various types.

Condensing Equipment (76122 A). G. L. Kothny. Ills. 20 pp. Am Soc Mar Drfts, Jl—Jan., 1917. Types, auxiliaries, and examples of calculations, with general review.

Keeping Up the Efficiency of Condensers (78006). M. A. Saller. Ills. 3500 w. Prac Engr, Chi—April 15, 1917. Causes of decreasing efficiency.

Traveling Water Screens for Condenser Intakes of Power Stations (82073). Henry J. Edsall. Ills. 4000 w. Elec Rev & Wes Elec—Oct. 27, 1917. Advantages, construction features, etc.

See also *Stokers.*

**Corrosion**

Condenser Tube Corrosion (80395 A). William Ramsay. Ills. 4500 w. Engng —July 13, 1917. Observations and experimental results.

See same heading under *Materials of Construction.*

**Down Draft**

Il Fumaiolo Delle Caldaie Per Termosifone (76906 B). C. A. Gullino. 1800 w. Mon Tec—Dec. 30, 1916. A down-draft boiler furnace for smoke prevention.

**Draft**

Draft and Its Application to the Steam Boiler (74748). E. A. Uehling. 3000 w. Power—Nov. 21, 1916. Conditions governing chimney draft; forced draft systems, etc.

Draft in Steam Boiler Practice (77429). J. D. Morgan. 900 w. Power—March 20, 1917. Its cost and effect.

**Economy**

Economy in the Use of Coal (76030). A. Bement. 2000 w. Prac Eng, Chi—Jan. 15, 1917. Serial, 1st part. Fundamentals in the combustion of coal.

**Engine Design**

A Comparative Study in Medium-Speed Steam Engine Design (80808 B). F. S. Bauer. 1200 w. Univ Col Jl Eng —April, 1917. Second installment on the discussion of effects on design when the important operating conditions are varied.

**Engines**

Is the Unaflow Type of Engine More Economical than the Counterflow Type? (74620 D). A. C. Ruhl. 2000 w. O S M E S E, Jl—Vol. IX, No. 1. Comparison and results of engine test.

Steam Needed by Perfect Engine (74434). F. R. Low. 800 w. Power—Nov. 7, 1916. Table giving number of pounds of steam required per i. h. p.-hour by an engine operating upon the Rankine cycle.

Steam-Engine Troubles — Pistons (75697). H. Hawkens. Ills. 2200 w. Power—Jan. 2, 1917. Serial, 1st part. Troubles due to features of design.

Unaflow vs. Counterflow as to Economy (76973). A. C. Ruhl. 1500 w. Prac Eng, Chi—March 1, 1917. From paper before Ohio Soc. Results of engine test.

Uniflow Steam Engine for Rod Mill Drive (77772). Charles C. Lynde. Ills. 1200 w. Bt Fc & Stl Pt—April, 1917. Nordberg uniflow used as drive for roughing stands.

Notes on the Design of Small High-speed Steam Engines (80098 A). Francis Thomas. Ills. 1200 w. Mech Wld—July 13, 1917. Serial, 1st part. Rules and formulæ for good modern practice.

Rotary Engine Built in 1870 (80226). Ills. 500 w. Power—July 31, 1917. Small engine of 3 h. p. capacity, with a flyball governor.

**Entropy**

Entropy and Some of Its Uses (78934). F. R. Low. 1000 w. Power—May 29, 1917. Serial, 1st part. Explanatory.

**Evaporator**

A New Evaporator (76232). Ills. 1300 w. Times Eng Supp—Dec. 29, 1916. Description of new device utilizing larger percentage of heat.

The Prache and Bouillon Evaporating Plants (75980 A). Ills. 4000 w. Engng —Dec. 29, 1916. Detailed description.

**Feed Pumps**

Centrifugal Versus Reciprocating Boiler Feed Pumps (74530). M. William Ehrlich. Ills. 2000 w. Elec Wld—Nov. 11, 1916. Comparisons of performance.

**Feed Water**

Feed Water Control (76029). Ills. 1200 w. Prac Engr, Chi—Jan. 15, 1917. Serial, 1st part. Advantages of automatic regulation and description of modern controlling appliances.

A Study of Boiler Feed Water (77132 A). George L. Fowler. 3000 w. Ry Mech Engr—March, 1917. Chemical reaction in boilers; general principles involved.

Bleeding Turbines to Heat Feed Water (78635). H. F. Gauss. Ills. 2000 w. Power—May 15, 1917. Showing theoretical gain in economy.

The Importance of Scientific Feed-Water Regulation (81115). R. W. Andrews. 4000 w. Elec Rev & Wes Elec—Sept. 15, 1917. Scientific control of feed-water in relation to load and furnace conditions necessary for efficient boiler operation.

**Feed-Water Heaters**

Performance and Design of Surface Feed-Water Heaters (81156 F). M. C. Stuart. 21 pp. Am Soc Nav Engrs, Jl—Aug., 1917. New methods of showing relation between tube length and water temperature, etc.

**Firegrates**

Firebars and Firegrates (77930 A). Walter J. May. 1000 w. Mech Wld—March 30, 1917. The requirements and proper working.

**Firing**

Hand-Firing Soft Coal (75795). Charles H. Bromley. Ills. 2000 w. Power—Jan. 9, 1917. Best methods.

Combination Coal and Gas Firing (79887). Alex. W. Morgan. Ills. 1500 w. Elec Wld—July 14, 1917. Methods used to burn coal and coke-oven gas simultaneously under same boilers.

**Fuel Economy**

Saving Fuel in a Large Industrial Boiler Plant (76272 A). David Moffat Myers. 5500 w. Ind Man—Feb., 1917. Saving effected through bonus system.

Fuel Economy by Co-operation in Establishing a Better Practice in the Operation of Stokers and Boilers (81271 N). Joseph G. Worker. Ills. 3000 w. Assn I S E E—Sept., 1917. Discusses coal waste and need for efficiency.

**Fuel Losses**

The Loss of Coal Through Grates (76952). Carleton W. Hubbard. Chart. 3000 w. Power—Feb. 27, 1917. Methods of determining the fuel loss.

**Fuels**

Solid Fuels (76188 A). S. G. Martlew. Abstract of paper before Assn. of Engrs.-in-Chg. 4500 w. Mech Engr—Jan. 12, 1917. The different fuels are briefly considered.

The Use of Coke and Coke-Breeze for Steam Generation (76551 A). John B. C. Kershaw. 4000 w. Engr—Jan. 19, 1917. Conditions of combustion and forms of grate required, tests, etc.

The Utilization of Waste-Products and of Low-Grade Fuels for Power Generation 76725 A). John B. C. Kershaw. 3500 w. Met & Chem Eng—Feb. 15, 1917. Data relating to calorific value of refuse for steam raising; recent improvements of the destructor process.

Equivalent Cost of Coal and Oil as Fuel (77256). R. L. Wales. Chart. 1500 w. Power—March 13, 1917. Chart to assist in quickly determining equivalent cost, with some advantages of oil.

Combustion for Raising Steam (77585). 1300 w. Times Eng Supp—Feb. 23, 1917. Abstract of paper on oil fuel by J. S. S. Brame, before Inst'n Petroleum Technologists.

Liquid Fuel and Its Combustion (77415 A). J. S. S. Brame. 3500 w. Colly Gdn—March 2, 1917. From paper before Instn. of Petroleum Tech. Composition of fuel oils; types of atomizers; combustion, etc.

Grave Danger of Fuel Famine (78333 A). Walter N. Polakov. 1000 w. Ind Man—May, 1917. Shows the danger and how to avert it.

Notes on the Use of Low-Grade Fuel in Europe (77957). R. H. Fernald. Ills. 35 pp. U S Bur Mines—Tech paper 123. Information relating to the utilization of high-ash coals, wood, refuse, peat, powdered fuel, etc.

The Fuels of Texas (78003). A. C. Scott. 4500 w. Cl Age—April 14, 1917. Comprise, wood, coal, lignite, oil and natural gas.

Scientific Aspects of Coal Economy (78267 A). John W. Cobb. 2400 w. Nature—Mar. 15, 1917. Abstract of report of British Association Committee. Measures of economy.

Coke Braize and Its Utilization (78529). W. A. Hamor. Ills. 1500 w. Cl Age—May 5, 1917. Methods of burning this refuse under boilers.

Pulverized Coal in Kansas Railway Power Plant (78372). Frank R. Hunter. 3000 w. Natl Engr—May, 1917. Equipment and results.

Meeting the High Price of Coal (78620). L. D. Shank. Ills. 1800 w. Elec Wld—May 12, 1917. Supplemented steam plant with a crude oil engine.

The Utilization of Low-Grade Fuels (78584 A). John W. Cobb. 3000 w. Ir & Cl Trds Rev—April 13, 1917. Limited to discussion of low-grade forms of coal and coke.

Powdered Coal (79246). 3000 w. Ry Age Gaz—June 15, 1917. Abstract of a committee report presented at the 1917 convention of the Int. Ry. Fuel Assn.

Equivalent Cost of Coal and Oil as Fuel (79642). R. L. Wales. Chart. 1800 w. Eng & Min Jl—June 30, 1917. Comparison of the costs.

Fuel and Power Supply (79579 A). E. W. L. Nicol. Ills. 2500 w. Elec'n—June 15, 1917. Considers the mechanical stoking of large capacity steam boilers exclusively with gas coke as fuel, and matters relating to the efficient combustion of non-volatile coke as fuel.

The Utilization of Low-Grade Fuels (80511 A). John W. Cobb. 2500 w. Mech Wld—Aug. 3, 1917. Considers low grade forms of coal and coke, and methods of using them in various industries and localities.

Coal Concreted From Dusts or Ashes (80968 A). R. Goulburn Lovell. Second paper before Soc. of Archts. 2200 w. Surv'r—Aug. 10, 1917. Possible fuel from waste. Tabulated analyses.

**Fuel Sampling**

See SAMPLING, under Mining and Metallurgy, *Coal and Coke*.

**Furnace Temperatures**

Boiler Furnace Temperatures (76155). George C. Cook. 2200 w. Power—Jan. 23, 1917. Effect of increased furnace temperatures on the heat absorption and efficiency.

**Gas Firing**

Gas Burners for the Firing of Boilers (79582 A). Ills. 1000 w. Elec'n—June 15, 1917. Notes on burners now in use.

Gas-Fired Boilers (79581 A). William B. Woodhouse. 1500 w. Elec'n—June 15, 1917. The conditions necessary for perfect combustion, and the economies.

Principles and Methods of a New System of Gas Firing (81856 A). A. C. Ionides. Read before the Inst. of Metals. Ills. 1600 w. Engng—Sept. 28, 1917. Problems involved and advantages of employing these principles.

**Gas Fuel**

Burning Blast Furnace Gas Under Boilers (78238 B). Ills. 32 pp. Engrs Soc West Penn, Pro—April, 1917. A topical discussion.

**Grates**

Grates for Coke Firing (79580 A). Ills. 1500 w. Elec'n—June 15, 1917. Details of types of mechanical stokers.

**Heat-Transmission**

A study of Heat Transmission in Steam Boilers (74834 A). Victor R. Gage. 3000 w. Sib Jl Eng—Nov., 1916. Experimental work and results.

The Influence of Retarders on the Transmission of Heat Through Boiler Tubes (78090 N). R. Royds. 20 pp. Instn E D S Scot—March, 1917. Limited to apparatus and boilers having the gases flowing through the tubes and the water on the outside.

**Hoisting Engines**

Air-Balanced Hoisting Engine (74433). Ills. 1200 w. Power—Nov. 7, 1916. Uses a mixture of compressed air and saturated steam during hoisting.

**Indicator Diagrams**

A Rapid Method of Plotting Combined Indicator Diagrams (77013 A). A. R. Munro. Ills. 1100 w. Engr—Feb. 9, 1917. Uusing a drafting machine on a drawing board or table near the engine.

**Indicators**

The Steam Engine Indicator (80210). Harry Murray Jones. Ills. 3500 w. Natl Engr—Aug., 1917. Early types; uses; diagrams, etc.

**Injectors**

Operation of an Automatic Injector (76953). V. R. Gage. Ills. 3000 w. Power—Feb. 27, 1917. Explanation of the fundamental theory and data, relating to the operating limits.

Injectors (78649). Ills. 2000 w. Prac Eng, Chi—May 15, 1917. Serial, 1st part. Theory, construction and operation of various types.

**Inspection**

Some Experiences of a Boiler Inspector (74619 D). Rober J. Huddleson. 1400 w. O S M E S E, Jl—Vol. IX, No. 1. Things observed.

**License Examination**

Steam Engineer's License Examination (75800). H. F. Gauss. 2500 w. Power—Jan. 9, 1917. Serial, 1st part. Outlines the requirements.

**Losses**

Sources of Loss in Steam Plants (80803). R. E. Clizbe. 1500 w. Power—Aug. 28, 1917. Points out some of the sources of losses in the average American plant.

**Lubrication**

Lubrication of Steam Engine Cylinders (75348). John Rome Battle. 3000 w. Prac Eng, Chi—Dec. 15, 1916. Selection of proper lubricant; methods of feeding.

Lubrication of Steam Turbines (77917 A). T. C. Thomsen. Ills. 3000 w. Engr March 16, 1917. Serial, 1st part. Considers lubricating and oil-cooling systems.

**Natural Steam**

Volcanic Heat Harnessed (75580). 1000 w. Times Eng Supp—Nov. 24, 1916. Use of volcanic steam in 15,000 horsepower plant in Italy.

Harnessing a Volcano to a 15000-Horse-Power Electric Power-House (75137 A). Prof. Luiggi. 1100 w. Engng—Nov. 17, 1916. Details of a successful installation in Italy.

**Oil Fuel**

Oil Fuel in New England (75392). Charles H. Bromley. Ills. 1500 w. Power—Dec. 19, 1916. Factors determining the best fuel to use. At Pawtucket, R. I.

Oil Burning (79080 A). B. S. Nelson. Ills. 8500 w. A S M E, Jl—June, 1917. Details for burning oil under boilers to produce steam, with particular reference to stationary boilers Also discussion.

Use of Oil as Fuel (78960 A). J. V. Hunter. Ills. 8500 w. Machy—June, 1917. Cost, storage and feeding systems, types of burners, etc.

Oil-Burning Systems (79877). H. J. Teiper. Ills. 1800 w. Prac Eng, Chi—July 15, 1917. Characteristics of fuel; equipment required, etc.

Oil Fuel Installations (80541). H. J. Geake. From paper before B. C. Assn. of Sta. Engrs. 1500 w. Prac Eng, Chi—Aug. 15, 1917. Their care and management.

**Oiling**

Turbine Oiling System in Essex Power Station (79275). A. T. Brown. Ills. 2200 w. Power—June 19, 1917. An oiling and filtering system and its operation.

**Packing Rings**

Piston Rings (79726 A). Ills. 2500 w. Mech Wld—June 22, 1917. Types of rings used, and points in removing and refitting.

**Peat**

The Value of Peat Fuel for the Generation of Steam (79813 N). John Blizard. Ills. 42 pp. Can Dept Mines—Bul No. 17. Report of boiler trials.

**Pipe**

Higher Unit Stresses for Pipe and Computation of Water-Hammer Pressure Advocated (75689). Burton M. Jones. 2000 w. Eng Rec—Dec. 30, 1916. Proposed method outlined.

**Pipe Coverings**

The Effect of Surface Conditions Upon the Rate of Heat Transmission Through Steam Pipe Coverings (74658). A. D. Fulton and R. C. Parlett. 2500 w. Wis Engr—Nov., 1916. Serial, 1st part. Thesis for degree of Mech. Engr. Research work.

**Piping**

Auxiliary Steam Piping (75817 B). Ills. 1500 w. Prac Eng, Chi—Jan. 1, 1917. Suggested arrangements.

Blowoff Piping (75810 B). Ills. 1500 w. Prac Eng, Chi—Jan. 1, 1917. Methods of arranging and protecting.

Exhaust Lines (75818 B). Ills. 2200 w. Prac Eng, Chi—Jan. 1, 1917. Connections to atmosphere, heating systems, feed-water heaters, and condensers.

Expansion in Piping (75805 B). Ills. 4000 w. Prac Eng, Chi—Jan. 1, 1917. How to determine and provide for.

Feed Lines (75809 B). Ills. 2500 w. Prac Eng, Chi—Jan. 1, 1917. Materials and methods used.

Fuel Oil Systems (75820 B). Ills. 2200 w. Prac Eng, Chi—Jan. 1, 1917. Arrangements for handling.

Oil Piping (75819 B). Ills. 2500 w. Prac Eng, Chi—Jan. 1, 1917. Systems for handling oils used about plants.

Pipe Branches and Turns (75804 B). Ills. 1500 w. Prac Eng, Chi—Jan. 1, 1917. Devices for connecting pipes at angles.

Pipe Covering (75806 B). Ills. 2000 w. Prac Eng, Chi—Jan. 1, 1917. Material used.

Pipe Joints (75803 B). Ills. 3000 w. Prac Eng, Chi—Jan. 1, 1917. Details of methods of joining pipes in a straight line.

Piping Materials (75801 B). 3000 w. Prac Eng, Chi—Jan. 1, 1917. Materials used and their characteristics.

Steam Piping (75816 B). Ills. 3000 w. Prac Eng, Chi—Jan. 1, 1917. Arrangements of mains and headers, etc.

Supporting and Installation (75807 B). Ills. 3000 w. Prac Eng, Chi—Jan. 1, 1917. Material required; cutting, etc.

Types of Piping (75802 B). Ills. 2000 w. Prac Eng, Chi—Jan. 1, 1917. Methods used with various materials.

**Piston Rings**

Piston Rings (79289 A). Ills. 2000 w. Autocar—June 2, 1917. Particulars in regard to their manufacture.

**Poppet Valves**

The Poppet-Valve Steam Engine (80889 A). Siegfried Rosenzweig. Ills. 5500 w. A S M E, Jl—Sept., 1917. Present status in the United States of the poppet valve, uniflow, semi-uniflow and return-flow steam engines.

**Powdered Coal**

Pulverized Coal as Fuel for Power-Plant Boilers (82074). 2500 w. Elec Rev & Wes Elec—Oct. 27, 1917. Good results obtained.

**Power Plants**

The Ford Gas-Steam Plant (74747). Thomas Wilson. Ills. 2800 w. Power—Nov. 21, 1916. Special novel features.

See same heading under HEATING AND COOLING; and under POWER AND TRANSMISSION.

Dodge Brothers Power Station (78005). Ills. 1000 w. Prac. Engr, Chi—April 15, 1917. Detroit plant having loop pipe arrangements, and white glass switchboard.

Fort Wayne Municipal Plant (78220). Thomas Wilson. Ills. 2000 w. Power—April 24, 1917. A steam turbine plant with water-tube boilers having top-feed stokers.

Waltham Watch Power Plant (77790). Ills. 1000 w. Natl Engr—April, 1917. Provides power, light and heat for factory services.

**Prime Movers**

Progress and Outlook in Prime Movers (75755). W. F. Durand. 2000 w. Elec Wld—Jan. 6, 1917. Problems in connection with the development of power.

**Recorders**

$CO_2$ Recorders and Their Value (76156). Victor J. Azbe. Ills. 1800 w. Power—Jan. 23, 1917. Useful information on the installation and working.

**Regulators**

Automatic Boiler Feed-Water Regulators (74617 D). F. W. Marquis. Ills. 5000 w. O S M E S E, Jl—Vol. IX, No. 1. Types now on the market, their advantages and disadvantages.

**Smoke**

Engineering Phases of Smoke Abatement (77275 B). Osborne Monnett, with discussion. Ills. 23 pp. Engrs' Soc of West Penn, Pro—Dec., 1916. Importance of draft.

Smoke Reduction in Boiler Furnaces (81136). Joseph Goder. Ills. 2000 w. Power—Sept. 18, 1917. Causes and principles involved in its efficient reduction.

**Soot**

Continuous Removal of Soot (79524). Ills. 700 w. Power—June 26, 1917. Details of apparatus of a continuous blowing system.

Effect of Soot on Boiler Efficiency (81116). Robert June. Ills. 1600 w. Elec Rev of Wes Elec—Sept. 15, 1917. Various methods of soot removal.

**Standardization**

Ten Years of Boiler Standardization (81337). John A. Stevens. 2200 w. Power—Sept. 25, 1917. Review of the conception and development of the boiler code adopted by the A. S. M. E.

**Steam**

Economic Generation of Steam (79655). Christ Schillinger. 4000 w. Nat'l Engr—July, 1917. With special reference to the anthracite mining industry. Read before N. A. S. E. of Wilkes-Barre.

The Latent Heat of Steam (80114 A). Frank B. Aspinall. Ills. 4000 w. Engr—July 6, 1917. Serial, 1st part. Details of investigations.

**Steam Engine**

Early History of the Steam Engine (78676 A). V. A. Wilkes. Read before Nat. Assn. of Colly Mgrs. 2500 w. Ir & Cl Trds Rev—April 27, 1917. Review of the development.

**Steampipes**

Stresses in Steampipes (77107 A). Robert F. McKay. 1500 w. Mech Cold—Feb. 23, 1917. Particularly stresses due to expansion and contraction.

**Steam Plants**

Power Equipment for Steam Plants (76967 A). Robert L. Streeter. Ills. 4500 w. Ind Man—March, 1917. Seventh part of a serial. Some auxiliaries necessary for economical operation.

Power Equipment for Steam Plants (77624 A). Robert L. Streeter. Ills. 6500 w. Ind Man—April, 1917. Eighth and concluding article of a series. Feed-water purification, heating and pumping.

**Steam Pressures**

The New Era of Higher Steam Pressures (74549). Rober Cramer. 1800 w. West Eng—Nov., 1916. Believes pressures considerably higher than the present standard of 200 lb. will soon come into use.

**Steam Raising**

Economical Steam Raising (74779 A). 1400 w. Cas Eng Mthly—Nov., 1916. The gas-heated steam boiler and its uses.

Steam Raising with Large Coke (74490 A). From *Stahl und Eisen*. Ills 1200 w. Colly Gdn—Oct. 20, 1916. Experiments carried out in Germany.

**Steam Turbines**

Mechanical Difficulties in the Evolution of the Steam Turbine (77169 A). 1800 w. Engng—Feb. 16, 1917. Editorial review of early troubles.

Steam Turbine Operation (77196). George F. Weaton. 3500 w. Natl Engr—March, 1917. Precautions.

**Stokers**

Moloch Underfeed Stoker (74485). Ills. 1200 w. Power—Nov. 7, 1916. Detailed description and main features.

Automatic Stokers (75287 A). R. C. Beadle. 1200 w. Ice & Refrig—Dec., 1916. Advantages over hand-firing.

Power Equipment for Steam Plants (76346 A). Robert L. Streeter. Ills. 6000 w. Ind Man—Feb., 1917. Sixth article. Mechanical stokers and condensers.

Operating Mechanical Stokers (78634). Warren O. Rogers. Ills. 2500 w. Power —May 15, 1917. General instructions for handling chain-grate stokers. Maintenance and repairs.

Application of Stokers to Moderate Sized Furnace (81117). Franklin G. Rogers. Ills. 2000 w. Elec Rev of Wes Elec—Sept. 15, 1917. Advantages.

Operation of Mechanical Stokers (81677). H. F. Lawrence. Ills. 2000 w. Power—Oct. 9, 1917. Practical operation of several types of Taylor stokers.

**Superheaters**

Superheaters (75617 A). R. L. Streeter. Ills. 7200 w. Ind Man—Jan., 1917. Various types of superheaters as applied to stationary boilers. Economies effected.

Results with Superheated Steam (79050). B. N. Broido. Ills. 1200 w. Power—June 5, 1917. States results from use of superheaters in existing plants

**Superheating**

The Anomaly in Superheat Corrections (76383 A). 1800 w. Engng—Jan. 12, 1917. Editorial. Theoretical discussion.

**Surface Condensers**

The Proportioning of Surface Condensers (74314 A). George A. Orrok. Abstract. 3000 w. A S M E, Jl—Nov., 1916. State of the art of "heat transfer in surface condensation" with design formula for use in proportioning.

The Proportioning of Surface Condensers (76994 A). 1200 w. A S M E, Jl—March, 1917. Discussion George A. Orrok's paper.

**Turbine Blades**

La Détérioration Des Aubages De Turbines A Vapeur (80728 B). Ills. 2900 w. Gen Civ—July 28, 1917. Serial, 1st part. Deterioration of the blades or buckets of steam turbines.

**Turbine Oil**

The Care of Turbine Oil (80360). 1500 w. Power—Aug. 7, 1917. General directions on how to avoid troubles due to frothing, gumming and emulsion.

**Turbines**

Steam Turbine Test (74329). Henry A. Cozzens, Jr. 1200 w. Nat Engr—Nov., 1916. Use of curves for reporting results.

The Bullerfors Turbine Plant (74571 A). Ills. 400 w. Engng—Oct. 27, 1916. Power plant at large mining and iron-works in Sweden.

Erosive Effect of Steam on Turbine-Blading Material (75296 F). T. J. Keleher. Ills. 500 w. Am Soc Nav Engrs, Jl —Nov., 1916. Research work.

Vibration in Impulse Turbines (75243). Eustis H. Thompson. 1000 w. Power—Dec. 12, 1916. Symptoms and causes.

Water Rates of Auiliaries (75489). R. von Fabrice. Charts. 1500 w. Power—Dec. 26, 1916. Comparison between the cost and water rates of two steam turbines.

Correcting Turbine Vibration (76028). Eustis H. Thompson. Ills. 3500 w. Prac Eng, Chi—Jan. 15, 1917. Serial, 1st part. Causes and remedies.

Steam Turbines for Land Purposes (76799 A). H. L. Guy. Read before Manchester Assn. of Engrs. 4000 w. Mech Engr—Feb. 9, 1917. Serial, 1st part. Recent developments.

Starting the Steam Turbine (80801). Ills. 3000 w. Power—Aug. 28, 1917. How to start the turbine and precautions to be observed to successfully get the turbine on and off the line. Valuable hints to engineers.

Versuche über die Regulierarbeit von Francisturbinen (80743 B). A. Strickler. Ills. 2200 w. Schweiz Bau—July 28, 1917. Methods of governing Francis turbines. Indicator diagrams; calculations.

Exhaust-Steam Turbines to Increase Power-Plant Capacities (80256). C. A. Tupper. Ills. 3500 w. Elec Rev & Wes Elec—July 28, 1917. Analysis of conditions necessary; operating methods used.

Efficiencies of Steam-Turbine Cycles (81133). C. F. Hirshfeld. 1500 w. Power—Sept. 18, 1917. Study of possible gains in economy by increasing the steam pressure and superheat.

Evolution of the Steam Turbine (80970 A). John A. Stevens. From a paper on "The Evolution of the Steam Turbine in the Textile Industry." 3000 w. Mech Wld—Aug. 17, 1917. Reasons for its rapid development. Types and uses.

Starting the Curtis Vertical Turbine (81339). Ills. 3000 w. Power—Sept. 25, 1917. Directions.

Steam Turbine Tests (80885). Henry A. Cozzens, Jr. 1800 w. Natl Engr—Sept., 1917. Instructive to turbine operators.

High Speed of Steam Turbines (81538). W. F. Schaphorst. 1000 w. Power—Oct. 2, 1917. Formulæ for centrifugal force, and methods of running test.

Some Troubles of Steam Turbines (81950). Eugene Bak. 1600 w. Power

—Oct. 23, 1917. Particularly with vertical machines.

The Steam Motor (81867). Ills. 1000 w. Power—Oct. 16, 1917. Details of design of a combined pump and blower unit manufactured at Springfield, Mass.

**Uniflow Engines**

Uniflow Engines as Rolling Mill Drives (75082). W. Trinks. Ills. 2500 w. Blt Fc & Stl Pt—Dec., 1916. Comparisons.

Characteristics of Uniflow Engine Generating Units (76652). E. Hagenlocher. Ills. 3000 w. Elec Wld—Feb. 10, 1916. Features of construction, performance characteristics, and fields of application.

**Valves**

The Design and Construction of High-Pressure Steam Stop-Valves (75880 A). D. MacNicoll. Read before Inst. of Marine Engrs. Ills. 1200 w. Mech Wld—Dec. 29, 1916. Serial, 1st part. Investigates various designs.

**Waste Gases**

The Use of Waste Gases for Steam Generation (80403 A). John B. C. Kershaw. 3500 w. Engr—July 13, 1917. Examples of waste heat utilization in United Kingdom, Belgium, Germany, and the United States.

**Waste Heat**

The Utilization of Waste Heat for Steam-Generating Purposes (74312 A). Arthur D. Pratt. Abstract. Ills. 2000 w. A S M E, Jl—Nov., 1916. Present-day practice.

The Utilization of Waste Heat for Steam-Generating Purposes (76468 A). 2200 w. A S M E, Jl—Feb., 1917. Discussion of Arthur D. Pratts' paper, with closure.

**Waste-Heat Boilers**

Efficiency of Waste-Heat Boilers (77955 A). H. A. Reichenbach. 1000 w. Iron Age—April 12, 1917. Graphical method of determination.

**Water Hammer**

Water Hammer Problems Solved by the Use of Alignment Charts (75186). R. L. Hearn. Ills. 3500 w. Can Engr—Dec. 7, 1916. Phenomena reviewed.

**Water Screens**

Traveling Water Screens for Condenser Intakes (78370). Henry J. Edsall. Ills. 2000 w. Prac Eng, Chi—May 1, 1917. Their advantages, especially in large plants.

**Water Treating**

Water Treating Systems (75814 B). Ills. 2000 w. Prac Eng, Chi—Jan. 1, 1917. Piping for softeners, heat treatment, and compound feeding.

**Water Tubes**

Action of Boiler Water Tubes in Service (74618 D). John C. McCabe. Ills. 1200 w. O S M E S E, Jl—Vol. IX, No. 1. Record of boiler tube movements, tests, etc.

## TRANSPORTING AND CONVEYING

**Aerial Tramway**

The Spanish Peak Aerial Tramway (76678 A). J. A. Kitts. Ills. 2000 w. West Eng—Feb., 1917. Tramway for carrying lumber.

The Spanish Peak Aerial Tramway (76977). J. A. Kitts. Ills. 2000 w. Min & Sci Pr—Feb. 24, 1917. Ropeway used for handling lumber.

An Aerial Tramway for the Saline Valley Salt Company, Inyo County, California (78310 D). F. C. Carstarphen. Ills. 33 pp. A S C E, Pro—April, 1917. Features of location, construction, and operations of a line built to carry salt a distance of 13½ miles.

Aerial Wire Ropeways (78201 A). J. W. White. Read before S. Wales Inst. of Engrs. 3500 w. Colly Gdn—March 30, 1917. Types and their operation.

Les Transports Par Cables Aériens (78299 C + D). A. Levy-Lambert. 7400 w. Soc Enc Ind Nat—Jan.-Feb., 1917. Various systems of aerial cableways.

Uses and Costs of Aerial Tramways (77886). William C. Kuhn. Ills. 1800 w. Eng & Min Jl—April 7, 1917. General discussion.

An Aerial Tramway for the Saline Valley Salt Company, Inyo County, California (80668 D). 1200 w. A S C E, Pro—Aug., 1917. Discussion of F. C. Carstarphen's paper.

An Aerial Tramway for the Saline Valley Salt Company, Iuyo County, California (81468 D). 1600 w. A S C E, Pro—Sept., 1917. Continued discussion of F. C. Carstarphen's paper.

**Aerial Transporters**

Avantages des Transporteurs Aériens (76260 B). M. Zack. 1000 w. La Nat—Jan. 13, 1917. Cable systems used, advantages and comparative costs.

**Ash Handling**

Pneumatic Ash-Handling Plant (80630 A). Ills. 1000 w. Engr—Aug. 3, 1917. Details of the Bennis ash-handling plant.

**Bucket Loaders**

The Economics of Material Handling in Manufacturing Plants (74953 A). Reginald Trautschold. Ills. 1500 w. Ind Man Dec., 1916. General features with averages of power and operating expenses. Last article of a series.

**Cableway**

Large Lumber Cableway Controlled by Waterwheels (77207). J. W. Swaren. Ills. 1300 w. Eng News—March 8, 1917. Carrier system five miles long, in California.

**Coal and Ashes**

Coal and Ashes Handling and Storage (76746). Henry J. Edsall. 2500 w. Prac Eng, Chi—Feb. 15, 1917. Serial, 1st part. Saving in labor and cost.

**Coal Handling**

Coal Handling Plant at Durban (80975 A). George Frederick Zimmer. Ills. & Plate. 3000 w. Engng—Aug. 17, 1917. Details of an important installation.

Devices to Unload Coal From Cars (81444 A). Horace Goldstein. Ills. 2500 w. Ind Man—Oct., 1917. Simple and inexpensive types of coal unloading and conveying apparatus.

Rearranging Facilities For Receiving Coal by Rail Instead of by Water (81012). Ills. 1800 w. Elec Ry Jl—Sept. 8, 1917. Market conditions made changes necessary.

The Handling of Coal by Hydraulic Means (81065 A). George Frederick Zimmer. 1000 w. Colly Gdn—Aug. 24, 1917. What has been accomplished and the possibilities.

**Concrete Transmission**

Transmission of Concrete by Air and Steam (81091 A). 4500 w. Engr—Aug. 24, 1917. Details of these methods, apparatus used, and applications.

**Conveyors**

The Jigging Conveyor Underground and Methods of Working (74743 A). W. A. Machin, with discussion. Ills. Read before Nat. Assn. of Col. Mgrs. 6000 w. Ir & Cl Trds Rev—Nov. 3, 1916. Systems of working with conveyors and methods of getting coal.

Coal-Loading Conveyors (75221 A). Ills. 2000 w. Elec'n—Nov. 24, 1916. Details of electrically-driven conveyors.

The Donald Portable Ship Elevator-Conveyor (75232 A). G. F. Zimmer. Ills. 1800 w. Engng—Nov. 24, 1916. Designed for loading cargo in and out of ships.

Chain Belt Conveyors (76895 N). W. H. Atherton, with discussion. Ills. 60 pp. Instn E & S Scot—Nov., 1916. Types of this class and their uses.

The Universal Gravity Bucket Conveyor (76380 A). George Frederick Zimmer. Ills. 2500 w. Engng—Jan. 12, 1917. Recent types possessing greater flexibility.

The Development of Appliances For Handling Raw Materials and Merchandise at Ports and Other Large Centres of Traffic (81190 N). John Purser Griffith. 26 pp. Instn C E—Oct. 24, 1916. "James Forrest" lecture.

**Crane Design**

Principles Used in Designing 50-ton Locomotive Crane (79128 A). Gordon Beulke. Ills. 2000 w. Af Eng Soc of Minn, Bul—June, 1917. Deals with a locomotive jib-crane believed to be the largest of its type in the world.

**Cranes**

Panama Has Largest Locomotive Jib-Crane (79229). Ills. 1000 w. Eng News-Rec—June 14, 1917. All-steel 500-ton steam operated machine at Balboa yards and dry docks.

Five-Ton Electric Goliath Cranes (80982 A). Ills. 700 w. Engr—Aug. 17, 1917. Cranes recently supplied to a munition works in France.

Floating Steam Cranes (81850 A). Ills. 1200 w. Engng—Sept. 14, 1917. Details of two cranes, one a self-propelled 30-ton crane for Rio de Janeiro, and the other a non-propelled 50-ton crane for Quebec.

High-Power Cranes for Heavy Loads (81840 A). H. Hubert. Ills. 2000 w. Eng Rev—Sept. 15, 1917. Serial, 1st part. Notable advances in lifting and transporting appliances.

32-Ton Electric Travelling Coaling Crane (81854 A). Plates. 1500 w. Engng—Sept. 28, 1917. For use in Glasgow harbor. Detailed description.

See same heading under MARINE AND NAVAL ENGINEERING.

**Electric Traverser**

30-Ton Electric Traverser; Moor Street Station, G. W. R., Birmingham (77653 A). Ills & Plate. 1500 w. Engng—March 9, 1917. Detailed description.

**Elevators**

The Plunger Elevator (81373 A). H. Eisert. 2000 w. E Cb Balt, Jl—Aug., 1917. Explains the action, and the economic operation.

**Floating Cranes**

Electrically-Driven Floating Cranes (74752 A). Ills. 3500 w. Elec'n—Nov. 10, 1916. Particulars of a 150-ton crane, by Messrs. Smulders, of Rotterdam, and of a 250-ton crane by the Deutsche Maschinenfabrik A. G., of Duisburg, Germany.

**Grab**

The "Peters" High-Purchase Grab (77167 A). Ills. 700 w. Engrg—Feb. 16, 1917. Details and advantages, especially for ore-handling in different places.

**Handling**

Handling Materials (76817 A). Ills. 1000 w. Iron Age—Feb. 22, 1917. Contrivances for conveying and for storing.

Time Savers in Handling Material

(76959 A). William P. Kennedy. Ills. 3500 w. Ind Man—March, 1917. Devices that enable motor trucks to do effective work.

Handling Freight in Shipping and Store Rooms (79558 A). Horace Goldstein. Ills. 2500 w. Ind Man—July, 1917. Improved designs in devices and conveyors.

Factory Transportation (79661 A). Edward K. Hammond. Ills. 12000 w. Machy—July, 1917. Serial, 1st part. Reviews existing methods of moving work in the factory.

**Handling Equipments**

Methods for Handling Coal and Ashes (77998). Ills. 1500 w. Elec Ry Jl—April 14, 1917. Typical equipments.

Handling Ashes at Steel Plants (77080 A). Herbert E. Birch. Ills. 2000 w. Iron Age—April 19, 1917. Development of the skip hoist and applications.

The Development of Appliances for Handling Raw Materials and Merchandise at Ports and Other Large Centres of Traffic (74559 A). John Purser Griffith. 5000 w. Elec'n—Oct. 27, 1916. Abstract of "James Forrest" lecture before Inst. of Civ. Engrs.

Coal and Ash Transportation at Producers (78477). H. V. Schiefer. Ills. 1700 w. Bt Fc & Stl Pt—May, 1917. Eliminating the human factor.

**Japanese Plant**

Coal and Ash Handling Plant at the Osaka Electric Works (80788 A). George Frederick Zimmer. Ills. 2000 w. Engr—Aug. 10, 1917. Distinguishing features of a most complete installation.

**Labor-Saving Devices**

Handling Goods by Machinery (76229). Times Eng Supp—Dec. 29, 1916. Inefficient methods of coaling ships and unloading grain prevailing at British ports.

**Lifting Devices**

Electric Pulley Blocks and Trolley Hoists (77649 A). 1500 w. Mech Wld—March 9, 1917. Types and applications in industry.

**Material Handling**

How Construction Materials Are Stored and Handled in San Francisco (76356). B. P. Legare. Ills. 1500 w. Elec Ry Jl—Jan. 27, 1917.

Handling Materials Automatically With Skip Hoists (80514 B). H. V. Schiefer, with discussion. Ills. 5000 w. Cleve Eng Soc, Jl—July, 1917. Installations and their operation.

**Ore Docks**

Car Handling on Ore Docks (75864). Charles E. Cole. Ills. 1500 w. Elec Jl—Jan., 1917. Rope haulage vs. electric locomotives.

**Piers**

Pennsylvania Export Pier at Baltimore (78843). Ills. 2500 w. Ry Age Gaz—May 25, 1917. Modern facilities for transferring coal and coke from cars to vessels.

**Ropeways**

Aerial Ropeways on the Reversible System (74488 A). Ills. 2200 w. Mech Wld—Oct. 27, 1916. Principles governing the design and construction of details.

The Ropeway Installation of the Blaenavorn Company, South Wales (79053 A). George Frederick Zunmer. Ills. 1000 w. Colly Gdn—May 18, 1917. Three installations between coal pits, washery, and coke oven plant.

Aerial Wire Ropeways (80096 A). J. W. White. From a paper read before the S. Wales Inst. of Engrs. 3500 w. Quarry—July, 1917. Types and their uses in different situations.

**Telphers**

Telpher Installation at the Dalmarnock Gas Works, Glasgow (77168 A). G. F. Zimmer. Ills. & plate. 1500 w. Engrg—Feb. 16, 1917. Serial, 1st part. Details of the track, the machine and its operation.

**Transporters**

Three-Ton Electric Transporters at a National Projectile Factory (81360 A). Ills. & Plate. 700 w. Engng—Sept. 7, 1917. Details of serviceable transporters erected at one of the National Projectile factories.

## MISCELLANY

**Cane Sugar**

The Manufacture of Cane Sugar (80242 A). E. L. Stream, with discussion. 8000 w. La Eng Soc—Aug., 1917. General knowledge required by an engineer in a sugar factory.

**E. D. Leavitt**

An Account of the Engineering Work of E. D. Leavitt (81519 A). F. W. Dean. Ills. 5000 w. A S M E, Jl—Oct., 1917. His work in the design of large steam engines and other machinery.

**Gas Engineers**

The Gas Engineer of the Last Century (74981 A). Harry E. Jones. 3000 w. Engr—Nov. 10, 1916. Summary of the Inst. of Mech. Engrs. "Thomas Hawksley" lecture.

**Laundry Machinery**

Modern Steam Laundry Machinery (74499 A). Ills. 2000 w. Engr—Oct. 20, 1916. Serial, 1st part. Modern designs employed in steam laundries and public institutions.

**Mobile Armament**

Mobile Armament for Defense (81888 B). Andrew M. Coyle. Ills. 31 pp. U S Art, Jl—July-Aug., 1917. Deals with armed and armored automobiles and railway cars, and heavy mobile guns. Features of types in Europe.

**Munitions**

Shortcomings of Munitions Makers (76312 A). G. F. Matteson. 2200 w. Iron Age—Jan. 25, 1917. Haste and change causes of failure.

**Paper Industry**

The Pulp and Paper Industry in Canada (80546 A). O. F. Bryant. 6500 w. Roy Soc Arts, Jl—July 27, 1917. Serial, 1st part. Details of processes used.

**Spontaneous Ignition**

Spontaneous Ignition Studied by Means of Photographic Plates (75007 A). Frederick J. Hoxie. Ills. 2500 w. A S M E, Jl—Dec., 1916. A study. (Abstract.)

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The Ajo District, Arizona (77381). A. J. Hoskin. Ills. 2200 w. Eng & Min Jl—March 17, 1917. Developments.

**Blast Furnaces**

The Calculations of Lead Blast Furnace Charges for Students of Metallurgy (75968 A). Boyd Dudley, Jr. 8500 w. Met & Chem Eng—Jan. 15, 1917. Serial, 1st part. Outline of methods.

**California**

Revival of the Cerro Gordo Mines (76762). Lewis H. Eddy. Ills. 1000 w. Eng & Min Jl—Feb. 17, 1917. An old producer of lead-zinc ores reopened and operated by modern methods.

The Dairy Farm Mine, California (77628). J. E. Harding. Ills. 2000 w. Eng & Min Jl—March 24, 1917. Methods.

**Copper**

Les Métallurgies Autres Que Celle du Fer (75595 C—D). L. Guillet. Ills. 9000 w. Soc Enc Ind Nat—Sept.-Oct., 1916. Copper, zinc, lead, aluminum, etc., in principal countries of the world. Statistics of production covering long periods of time. Charts.

Copper (75761). 7000 w. Eng & Min Jl—Jan. 6, 1917. Production, smelting and refining works, market, reports from districts, etc.

Copper in 1915 (76308 N). B. S. Butler. 68 pp. U S Geol Surv, 1 : 21—Dec. 20, 1916. General report on production, prices, etc.

Les Remplaçants Du Cuivre En Allemagne (76250 B). 1000 w. La Nat—Dec. 16, 1916. Substitutes for copper in Germany. Estimate of available sources of aluminum.

The Corocoro Copper District of Bolivia (76337). Joseph T. Singewald, Jr., and Benjamin LeRoy Miller. Ills. 4800 w. Eng & Min Jl—Jan. 27, 1917. Geology, ore deposits and milling methods.

Copper Mining in British Columbia (76849). E. Jacobs. 1500 w. Can Min Jl—Feb. 15, 1917. Districts, production, and general information.

Flin-Flon Lake Copper District (76764). John W. Collinan. Ills. 1500 w. Eng & Min Jl—Feb. 17, 1917. Important deposits being developed.

Notes on the Occurrence of Native Copper in Arctic Canada (77363 N). J. J. O'Neill. 1800 w. Can Min Inst, Bul—March, 1917. Reports from these localities. Conditions, climate, etc.

When Will the Price of Copper Decline? (77037). H. D. Hawks. 2200 w. Elec Rv & Wes Elec—March 3, 1917. An analysis of present conditions.

Chino Copper Co. (78183). 2200 w. Eng & Min Jl—April 21, 1917. Annual report of this New Mexico property comparing profits of 1916 with those of 1915.

Ray Consolidated Copper Co. (77981). 1500 w. Eng & Min Jl—April 14, 1917. Annual report, comparing production of 1916 with 1915.

The Katanga Copper Deposits (78065 A). H. Foster Bain. Map & Ills. 2200 w. Min Mag—March, 1917. Outlines the geology of the ore deposits, in the Belgian Congo.

Inspiration Consolidated Copper Co. (78366). Map. 1000 w. Eng & Min Jl—Apr. 28, 1917. Excerpts from annual report of 1916.

Anaconda Copper Mining Co. (78683). 2500 w. Eng & Min Jl—May 12, 1917. Abstract of annual report.

Engels Copper Mines, California (78919). Lewis H. Eddy. Ills. 1500 w. Eng & Min Jl—May 26, 1917. The first all-flotation plant in the United States.

Kennecott and Braden Annual Report (78757). 1200 w. Eng & Min Jl—May 19, 1917. Reviews the report for 1916.

Nevada Consolidated Copper Co. (78756). Ills. 3000 w. Eng & Min Jl—May 19, 1917. Information from the last annual report.

Per Le Miniere Di Rame Italiane (79444 B). 1100 w. Ind—June 3, 1917. Status of Italian copper industry. State aid to mining.

Note on the Purity of Selected Copper Made in Converters (79985 N). Henry F. Collins. 700 w. Inst Min & Met, Bul—June 28, 1917.

Detrital Copper Deposits (80800). W. Tovote. 1200 w. Min & Sci Pr—Aug. 25, 1917. Short sketch of known occurrences.

Copper Operation of Compagnie du Boleo (81019). Lindsay Duncan. Ills. 1700 w. Eng & Min Jl—Sept. 8, 1917. Problems solved under difficulties and results obtained in Mexico.

Corocoro Copper Mines (81504). Francis Church Lincoln. Ills. 1700 w. Min & Sci Pr—Sept. 29, 1917. Famous copper district in Bolivia.

The Granby Mine at Anyox, B. C. (81785). Wakely A. Williams. Ills. 3300 w. Eng & Min Jl—Oct. 13, 1917. Serial, 1st part. Operating conditions; geological features, copper ore bodies, living conditions, mining methods, etc.

**Copper Converting**

Development of Copper Converting (81935 B). Milo W. Krejci. Ills. 4500 w. Eng & Min Jl—Oct. 20, 1917. (Special No.) Review of progress since the introduction of the process.

**Copper Refining**

Current Efficiency in Copper Refining (75784 A). Lawrence Addicks. 3000 w. Met & Chem Eng—Jan. 1, 1917. Conditions necessary for the best operation.

Current Density in Copper Refining (77349 A). Lawrence Addicks. 3500 w. Met & Chem Eng—March 15, 1917. General relations between current density and cost of operation.

The Spectroscopic Determination of Small Amounts of Lead in Copper (81730 N). C. W. Hill and G. P. Luckey. Ills. 1000 w. Am El-Chem Soc—Oct., 1917. For rapid determination of lead in factory samples of copper.

Raritan Copper Works at Perth Amboy, N. J. (81938 B). Ills. 2500 w. Eng & Min Jl—Oct. 20, 1917. (Special No.) Electrolytic refining of crude bullion at one of the world's largest plants, and production of commercial copper. Byproducts from slimes.

**Cuba**

Piñar del Rio Copper Region (74848). Richard H. Vail. 3000 w. Eng & Min Jl—Nov. 25, 1916. Impressions of trip through Cuba's new copper-mining region.

Minas de Matahambre, Cuba (81334). D. Ford McCormick. Ills. 3500 w. Eng & Min Jl—Sept. 22, 1917. Describes an important copper industry that has been developed in Cuba. Production and shipment problems solved.

**Extraction**

The Bisulphite Process (74701). 3500 w. Eng & Min Jl—Nov. 18, 1916. Process excellent in theory but a failure because of mechanical difficulties and habits of zinc monosulphite.

**Joplin**

Development and Underground Mining Practice in the Joplin District (81214 D). H. I. Young. Ills. 2500 w. A I M E, Bul—Sept., 1917. Phases of mining—prospecting, developing and operating.

The Zinc Ores of the Joplin District. Their Composition, Character and Variation (81215 D). W. George Waring. 3000 w. A I M E, Bul—Sept., 1917. Character and composition of the ores, and conditions under which they were deposited.

Ore-dressing Practice in the Joplin District (81582 D). Clarence A. Wright. 26 pp. A I M E, Bul—Oct., 1917. Outline of practice with the zinc and lead ores, with tests, and costs.

Present Milling Practice of the Joplin District (81638). Temple Chapman. Ills. 900 w. Eng & Min Jl—Oct. 6, 1917. Existing conditions and recent progress.

**Katanga**

Le Katanga Et Ses Richesses Minerales (76249 B). R. D'Andrimont. Illus. 3700 w. La Nat—Dec. 16, 1916. Mineral resources, consisting of coal, copper and tin, in Belgian Africa, near Lake Tanganyika, north of Rhodesia.

**Laboratory**

The New Jersey Zinc Co.'s Franklin Laboratory (80293 D). D. Jenkins. Ills. 1000 w. A I M E, Bul—Aug., 1917.

**Lead**

The Electric-Point Mine in Washington (75188). Arthur Lakes. Ills. 900 w. Min & Eng Wld—Dec. 9, 1916. Details of a lead producer.

The Lead Mines of Washington County, Missouri (75009). Sydney H. Ball. 3300 w. Min & Sci Pr—Dec. 2, 1916. Notes on a district first opened in 1720, when crude methods prevail.

Lead (75762). 7000 w. Eng & Min Jl—Jan. 6, 1917. Production, market, smelting works, districts, etc.

Lead Mines in Weardale, County Durham, Worked by the Weardale Lead Company, Limited (76418 B). Henry Louis. Map & Ills. 5500 w. Min Mag—Jan., 1917. The deposits and their development.

Lead Mining and Smelting at Galetta, Ont. (78121 D). William E. Newnam. Ills. 1000 w. A I M E, Bul—April, 1917. Deposits, workings, plant, etc.

Government Order Concerning Lead (78578 A). 1000 w. Engr—Apr. 13, 1917. Recent order of the Minister of Munitions in England.

Lead Mining in Derbyshire with Special Reference to the Mill Close Mine (78710 A). L. Stuckey. Maps & Ills. 4000 w. Min Mag—April, 1917. History, geology, development, etc.

Our Mineral Supplies—Lead (80465). C. E. Siebenthal. 1000 w. U S Geol Surv—Bul 666-AA. Prices and exports.

Salt in the Metallurgy of Lead (80296 D). Oliver C. Ralston, Clyde E. Williams, Marvin J. Udy, and G. J. Holt. 11 pp. A I M E, Bul—Aug., 1917. Results of important research work. Apparatus and methods employed.

L'État Actuel De L'Industrie Du Plomb (81403 B). Ch. Dantin. Ills. 6000 w. Gen Civ—Aug. 25, 1917. Present condition of the lead industry. Description of an important lead plant in Spain.

**Lead Ores**

The Metallurgy of Lead Ores in the Lower Mississippi Valley (79856 D). Herman Garlichs. 6 pp. A I M E, Bul—July, 1917. Reviews progress in metallurgical operations. Old practices and new.

**Lead-Silver**

The Tredinnick-Pattinson Process (78719 D). William F. Newman. Ills. 25 pp. A I M E, Bul—May 1, 1917. Report on the construction of plant and its operation.

The Picturesque Side of Jerome (78754). A. J. Hoskin. Ills. 2500 w. Eng & Min Jl—May 19, 1917. Comments on conditions in this Arizona copper district.

**Lead Smelting**

Lead Mining and Smelting at Galetta, Ont. (78365). William E. Newman. Ills. 1200 w. Eng & Min Jl—Apr. 28, 1917. To be read at St. Louis meeting of A. I. M. E. A simple but effective plant.

**Lead-Zinc**

A New Silicate of Lead and Zinc (78721 D). P. A. Van der Meulen. 800 w. A I M E, Bul—May, 1917. Describes a new silicate obtained from a lead-zinc furnace slag.

Milling Wisconsin Lead-Zinc Ores (79921 B). Walter Schultz. Ills. 2500 w. Eng & Min Jl—July 14, 1917. (Special.) Practice of this district.

**Metallurgy**

Le Développement De La Sidérurgie (76235 B). Ills. 1000 w. Gen Civ—Dec. 16, 1916. Production of pig iron, steel and coke in different countries of the world.

Metallurgy in 1916 (75765). 11000 w. Eng & Min Jl—Jan. 6, 1917. Different authors report on lead, copper, zinc, gold and silver.

**New Mexico**

Prospecting and Mining of Copper Ore at Santa Rita, New Mexico (76174 A). Donald F. Macdonald and Charles Enzian. Ills. and Maps. 115 pp. U S Bur Mines—Bul. 107. Location, general geography, ore deposits, mining methods, etc.

**Nickle**

Nickel in 1915 (76309 N). Frank L. Hess. 22 pp. U S Geol Surv, I : 24—Jan. 12, 1917. Nickel resources of the United States, uses, etc.

Report of the Nickel Commission (77982). 4500 w. Eng & Min Jl—April 14, 1917. Information from annual report. Considers both mining and metallurgy.

Report of Ontario Nickel Commission 78165). 6500 w. Can Min Jl—April 15, 1917. Report on resources and industries.

The Creighton Orebody (78166). C. W. Knight. Ills. 1200 w. Can Min Jl—April 15, 1917. Largest nickel mine which is being worked, and one of the greatest metalliferous mines of any kind.

British America Nickel Corporation's New Works in Ontario (80805). E. P. Mathewson. Ills. 700 w. Eng & Min Jl—Aug. 25, 1917. New works at Nickeltown, Ont., to be in operation in about two years. General description of the project.

**Queensland**

Mount Mudlo Copper Mine, Kilkivan District (75214 N). E. Cecil Saint-Smith. Ills. 4000 w. Qnsd Gov Min Jl—Oct. 14, 1916. Geological survey report.

**Refining**

Vaporization of Metallic Copper in Wirebar Furnaces (75957 A). Allison Butts. 1800 w. Met & Chem Eng—Jan. 15, 1917. Experiments made to determine loss.

**Sampling**

The Principles and Practice of Sampling Metallic Metallurgical Materials, with Special Reference to the Sampling of Copper Bullion (76003 A). Edward Keller. Ills. 94 pp. U S Bur Mines—Bul. 122. Theoretical considerations; practical sampling; procedure and equipment, etc.

**Spelter**

Spelter Statistics For 1916 (79782). W. R. Ingalls. 6500 w. Eng & Min Jl—

July 7, 1917. Production and consumption.

**Sulphuric Acid**

Fairlie Process for Sulphuric-Acid Manufacture (78182). 2000 w. Eng & Min Jl—April 21, 1917. Analytical method of controlling the chamber process. In successful operation for six years.

**Tin**

L'Étain Et Le Fer-Blanc; Métaux de Guerre (74922 B). P. Sallior. 1700 w. La Nat—Nov. 11, 1916. Sources of tin supply, and needs of France and other nations.

**Zinc**

The Future of the Zinc Smelting Industry in Great Britain (74463 A). H. C. H. Carpenter. 2000 w. Nature—Oct. 19, 1916. Explanation of the situation and the urgent needs of the industry.

Zinc Mines of Tonkin (74703). 2500 w. Eng & Min Jl—Nov. 18, 1916. Zinc industry in French Indo-China.

Zinc Reduction in British Columbia (74651). J. P. Keane. 2000 w. Can Min Inst, Bul—Nov., 1916. Present condition of the industry and its future.

Outlines for the Determination of Zinc (75359). R. Franklin Heath. 1500 w. Min & Eng Wld—Dec. 16, 1916. Methods.

Report on the Production of Spelter in Canada, 1916 (76318 N). Alfred W. G. Wilson. 60 pp. Can Dept Mines—No. 428.

Studies on the Origin of Missouri Cherts and Zinc Ores (75993 N). G. H. Cox, Reginald S. Dean, and V. H. Gottschalk. Ills. 30 pp. Mo Sch Mines, Bul—Nov., 1916.

Zinc (75763). 5000 w. Eng & Min Jl —Jan. 6, 1917. Production, market, districts, etc.

Electro-Deposition of Zinc from Aqueous Solutions (77366 N). E. P. Mathewson. 22 pp. Can Min Inst, Bul—March, 1917. Process adopted, with extensive bibliography.

The Determination of Zinc (76987 A). J. H. Hastings. 2000 w. Met & Chem Eng—March 1, 1917. Outlines practical methods of A. H. Low as modified for works' use.

Notes and Experiments Pertaining to the Metallurgy of Zinc (77736 A). Edward Mackay Johnson. 3500 w. Met & Chem Eng—April 1, 1917. Serial, 1st part. Interesting phases of zinc metallurgy.

Characteristics of Zinc Deposits in North America (78723 D). Frank L. Mason. Ills. 25 pp. A I M E, Bul—May, 1917. Their bearing on origin and tenure of economic life. Observations and conclusions.

The Media Mill, Webb City, Mo. (78722 D). H. B. Pulsifer. Ills. 2500 w. A I M E, Bul—May, 1917. Construction and equipment of a large mill designed for good recovery.

The Zinc Works Pottery (78422 A). Edward Mackay Johnson. 2500 w. Met & Chem Eng—May 1, 1917. Details of the making of retorts and condensers for this purpose.

Production Et Consommation Du Zinc Dans Le Monde (79419 B). Charts. 6200 w. Gen Civ—May 12, 1917. Graphic presentation of zinc production all over the world, and fluctuations in price over a series of years.

Sampling and Analyzing Zinc Ores and Products (80203). J. H. Hastings. 3000 w. Eng & Min Jl—July 28, 1917. Practical suggestions and methods in vogue.

The Electrometric Titration of Zinc (79759 B). F. Russell v. Bichowsky. 2500 w. Jl Ind & Eng Chem—July, 1917. Methods of zinc analysis.

The Formation of Zinc Ferrate (79847 N). E. H. Hamilton, G. Murray and D. McIntosh. 2000 w. Can Min Inst, Bul—July, 1917. Explanation of the low solubility of roasted zinc ores in dilute acid.

The New Zinc Fields of Kansas-Oklahoma (79764 B). Winthrop P. Haynes. Ills. 1000 w. Jl Ind & Eng Chem—July, 1917. Describes this new zinc district.

Operating Details of Zinc Retort Furnaces (80272 A). Edward Mackay Johnson. Ills. 2500 w. Met & Chem Eng—Aug. 1, 1917. Furnace work and tools.

Mining Methods of the American Zinc Co. of Tennessee (81213 D). H. A. Coy and H. B. Henegar. Ills. 2500 w. A I M E, Bul—Sept., 1917. Geology and description of methods.

The Zinc Mines of Tonkin (81342 A). 2000 w. Roy Soc Arts, Jl—Sept. 7, 1917. Account of the zinc regions in French Indo China.

Zinc Furnace Temperatures (81312 A). Edward Mackey Johnson. 1200 w. Met & Chem Eng—Sept. 15, 1917. Serial, 1st part. Data on different kinds of ores and furnaces.

Zinc Mining in Franklin, N. J. (81583 D). C. M. Haight and B. F. Tillson. Ills. 106 pp. A I M E, Bul—Oct., 1917. Methods of mining, operations, developments, etc.

Zinc Oxide Furnaces (81936 B). John F. Cregan. Ills. 5000 w. Eng & Min Jl—Oct. 20, 1917. (Special No.) Two types as developed in eastern and western practice are discussed.

**Zinc Burning**

Zinc Burning as a Metallurgical Process (81212 D). W. R. Ingalls. Ills.

2000 w. A I M E, Bul—Sept., 1917. Methods and applications.

Zinc Burning as a Metallurgical Process (81110). W. R. Ingalls. Ills. 3000 w. Eng & Min Jl—Sept. 15, 1917. On igneous concentration of zinc ores.

**Zinc-Lead**

Genesis of the Success Zinc-Lead Deposit, Cœur d' Alene District, Idaho (78073 B). Joseph B. Umpleby. Ills. 15 pp. Econ Geol—Feb.-March, 1917. Evidence collected during an examination of the mine in June, 1916.

**Zinc Oxide**

Oxide of Zinc (81211 D). George C. Stone. Ills. 4000 w. A I M E, Bul—Sept., 1917. Method of making zinc oxide, its history, uses, etc.

## COAL AND COKE

**Africa**

The New Coal-Field in West Africa (76013 N). Map and Ills. 9 pp. Imp Inst, Bul—July-Sept., 1916. Geological features; nature of coal; distribution, etc.

**Alberta**

Coal Mining Conditions and Industry in Alberta (76684 N). John T. Stirling. 2000 w. Can Min Inst, Bul—Feb., 1917. Quality, quantity ,development, etc.

Methods of Mining in Crowsnest Pass District, Alberta (81140). Raoull Green. Ills. 2000 w. Can Min Inst, Bul—Sept., 1917. Geological and physical features and system of coal mining.

**American Dyestuffs**

The American Dyestuff Industry (81308 A). I. F. Stone. 2500 w. Met & Chem Eng—Sept. 15, 1917. Editorial on the permanency of this industry, reviewing its history.

**Ammonia**

Direct Recovery of Ammonia (82039). 2000 w. Times Eng Supp—Sept. 28, 1917. Satisfactory results from improved processes of direct recovery at gas works.

**Analyses**

Analyses of Coals Purchased by the Government During the Fiscal Years 1908-1915 (77078). George S. Pope. 105 pp. U S Bur Mines—Bul. 19.

**Anthracite**

Anthracite Stripping (76190 D). J. B. Warriner. Ills. 27 pp. A I M E, Bul—Jan., 1917. Methods used in coal regions of Pennsylvania.

The Anthracite Industry in 1916 (75944). 6500 w. Cl Age—Jan. 13, 1917. Prices, production, etc.

Analysis of Anthracite Trade in Recent Months (77711). E. W. Parker. Ills. 2200 w. Cl Age—March 31, 1917. Serial, 1st part. Data concerning conditions, production, etc.

Anthracite Stripping (78139 D). Ills. 100 pp. A I M E, Bul—April, 1917. Discussion of J. B. Warriner's paper.

Anthracite Coal Strippings Near Scranton and Wilkes-Barre, Penn. (79039). Thomas F. Kennedy. Ills. 1800 w. Cl Age—June 2, 1917. Details of work now in operation.

Anthracite Coal (79576 A). W. H. Booth. 2200 w. Elec Rev—June 15, 1917. Serial, 1st part. Varieties and action in the process of combustion.

Methods of Mining in the Pennsylvania Anthracite Field (79650 A). Hugh M. Crankshaw. Read before the Manchester (Eng.) Geol & Min Soc. 6000 w. Colly Gdn—June 15, 1917. Methods in the different fields.

Walliser Anthrazit (81378 B). E. Höhn. 2000 w. Schweiz Bau—Aug. 11, 1917. Characteristics and analysis of an anthracite found in the southeastern part of France.

**Australia**

The Collie Coal Industry, Western Australia (76685 N). 1500 w. Min & Eng Rev—Jan., 1917. Summary of recommendations of the royal commission.

**Belgium**

Belgian Coal and Coke Industry in the War (82071). 2500 w. Cl Age—Oct. 27, 1917. Conditions in the Belgian coal fields during German occupation.

**Bengal**

Development of Deep Coal Areas in Bengal (80988 A). Glen George. 3500 w. Ir & Cl Trds Rev—Aug. 24, 1917. The economic question is considered.

**Benzol**

Recovery of Benzol and its Homologues From Coal Gas (79649 A). J. E. Christopher. Ills. 3000 w. Colly Gdn—June 15, 1917. Serial, 1st part. The extraction, heat treatment, rectification plant, etc.

**Bituminous**

The Bituminous Coal Mines of Crow's Nest Pass (75473). P. M. Sherwin. Ills. 1800 w. Cl Age—Dec. 23, 1916. Serial, 1st part. Connection of coalfields in Alberta and British Columbia.

Latest Improvements for the Preparation of Bituminous Coal (75741). Warren Roberts. Ills. 4000 w. Cl Age—Jan. 6, 1917. Details of latest apparatus.

Latest Improvements for the Preparation of Bituminous Coal (76335). H.

Reisser. 1800 w. Cl Age—Jan. 27, 1917. Believes a slow-moving apron offers best facilities for picking coal and involves less waste.

New Method in Screening, Picking, and Loading Bituminous Coal (80077). Ills. 1200 w. Cl Age—July 21, 1917. Arrangements described.

Steam-Shovel Mining of Bituminous Coal (81223 D). H. H. Stoek. Map & Ills. 35 pp. A I M E, Bul—Sept., 1917. Conditions favorable to steam-shovel mining; distribution of bituminous strippings by states; strip mining, etc.

**Blasting**

Electric Blasting-Caps and Delay-Electric Igniters (80192). I. H. Barkdoll. 1500 w. Min & Sci Pr—July 28, 1917. Suggestions for electric blasting.

**Borneo**

Some Personal Experiences of Coal Mining in North Borneo (74985 A). William Hopwood. Ills. 3500 w. Ir & Cl Trds Rev—Nov. 10, 1916. Brief description of its resources, especially the coalfields.

**Briquetting**

Modern Practice in Fuel Briquetting (75194). W. P. Frey. Ills. 2200 w. Cl Age—Dec. 9, 1916. Successful use of petroleum residuum as a binder.

Utilization of Ashbin and Other Refuse (75394 A). Herbert G. Coales. 1200 w. Surv'r—Dec. 1, 1916. Cheap fuel briquettes.

Fuel Economy, with Special Reference to Briquetting (75901 A). F. C. A. Lantsberry and J. Drummond Paton. 2500 w. Ir & Cl Trds Rev—Dec. 22, 1916. Abstract of paper and discussion before Manchester Geol. & Min. Soc.

L'Agglomération De La Houille (80028 B). Le Renié. Ills. 3400 w. La Nat—July 7, 1917. Methods and machines used in France for making briquettes from dust, slack and other waste coals. Improvements suggested.

Recent Briquet-Plant Installations (79775). G. J. Mashek. Ills. 2500 w. Cl Age—July 7, 1917. Details of successful briquetting of fine coal.

Coal Briquetting: With Special Reference to Anthracite Coal (81848 A). J. A. Yeadon. From paper before S. Wales Inst. of Engrs. 2000 w. Colly Gdn—Sept. 28, 1917. Processes of manufacture, types, etc.

**British Coal**

The Restriction of Our Coal Exports and Its Effect Upon the Gas Industries of the World (81178 A). Georg Frederick Zimmer. 3000 w. Engng—Aug. 31, 1917. Results in various countries due to cessation of British coal supply.

**British Columbia**

The Coal Creek Collieries, British Columbia (75195). Thomas Graham. Ills. 1500 w. Cl Age—Dec. 9, 1916. Operation, with reference to mine air.

**By-Products**

Recovery of Benzol from Coke-Oven Gas (76314 A). F. W. Speer, Jr. Ills. 3500 w. Iron Age—Jan. 25, 1917. Details of the process. From paper before Am. Inst. of Chem. Engrs.

The Recovery of Benzol from Gas (76448 A). F. W. Sperr, Jr. Ills. 4500 w. Met & Chem Eng—Feb. 1, 1917. Uses of benzol, and the recovery process.

The Rectification of Benzol (76702 A). W. Newton Drew. From a paper read before the Midland Inst. of Min., Civ., & Mech. Engrs. 2500 w. Colly Gdn—Jan. 26, 1917. Recent methods for washing.

Benzol and Toluol (80732). 2000 w. Times Eng Supp—July 27, 1917. Recovery of these two substances from coal gas. Modern methods and apparatus.

The Dye Problem Among the Entente Powers (80717 A). G. T. Morgan. 1200 w. Nature—July 19, 1917. Review of developments in the world's dye industry. Government assistance.

Die Verarbeitung der Gaswerk-Nebenprodukte (82000 B). F. Escher. Ills. 1700 w. Schweiz Bau—Sept. 1, 1917. Serial, 1st part. Manufacture of coal tar and other by-products from gas works.

**Cages**

Automatic Safety Mine Car Cages (80197). N. L. Harmon. Ills. 600 w. Cl Age—July 28, 1917. Detailed description.

**Canada**

The Coals of Canada: An Economic Investigation (74589 N). J. B. Porter and others, with bibliography. Ills. 183 pp. Can Dept Mns—No. 338. On the weathering of coal. Experimental work.

Coal Production in Canada in 1916 (75941). Ills. 2800 w. Cl Age—Jan. 13, 1917. Reports from Alberta, British Columbia, Nova Scotia, Saskatchewan.

The Production of Coal and Coke in Canada During the Calendar Year 1915 (77258 N). John McLeish. 42 pp. Can Dept Mines—No. 420.

The Coal-Fields and Coal Industry of Eastern Canada (79330 N). Francis W. Gray. Ills. & Map. 60 pp. Can Dept Mines—Bul 14. A general survey and description.

**Cannop Colliery**

Cannop Colliery and Its Water Difficulties (79737 A). Jno. J. Joynes. 4000 w. Ir & Cl Trds Rev—June 15, 1917. Outline of the water difficulties encountered and methods of dealing with them.

**Carbide**

Dangers Accompanying Use of Carbide (79636). J. R. Allardyce. 1500 w. Cl Age—June 30, 1917. Problems and dangers in handling.

**Carbonization**

The Prospects of the Carbonization of Coal, With By-Product Recovery as a South African Industry (75215 N). S. B. Bilbrough, with discussion. 12,000 w. So Af Inst Engrs, Jl—Nov., 1916. Methods in use and products produced.

The Primary Volatile Products of the Carbonization of Coal (79843 N). Guy B. Taylor and Horace C. Porter. Ills. 45 pp. U S Bur Mines—Tech paper No. 140. A sequel to Bul. 1, The Volatile Matter of Coal.

**Carbonizing**

Low Temperature Carbonizing and Some Products (80784 A). Robert Maclauren. Ills. 6000 w. Engng—Aug. 10, 1917. Read before Soc. of Chem. Ind. at Glasgow. Details of plant for production of smokeless fuel and power gas, and oil and ammonia as by-products.

**China**

Coal Mining in China (79850 A). Alfred C. Reed. Ills. 2200 w. Sci M—July, 1917. Describes the Ping Hsiang colliery and mining methods.

**Coal**

The Economic and Scientific Treatment of Coal (74772 A). Sydney H. North. 2500 w. Cas Eng Mthly—Nov., 1916. Brief review of early study of waste prevention, and reasons for conserving coal resources.

Coal in 1915 (75438 N). C. E. Lesher. Maps. 95 pp. U S Geol Surv, II:24—Dec. 16, 1916. Production.

The Utilization of Coal to the Best Advantage in the Interests of National Economy (74986 A). J. D. McArthur. Abstract of paper read before Inst. of Marine Engrs. 3500 w. Ir & Cl Trds Rev—Nov. 10, 1916. Predicts great development in the use of internal-combustion engines.

Coal in 1915 (76310 N). C. E. Lesher. 80 pp. U S Geol Surv, II : 25—Dec. 28, 1916. Distribution and consumption of coal produced in United States.

Coal and its Economic Utilization (76115 A). John S. S. Brame. 4500 w. Roy Soc Arts, Jl—Jan. 5, 1917. Howard lecture.

La Question Du Charbon En Angleterre (76239 B). 2000 w. Gen Civ—Dec. 23, 1916. Available supply, consumption and possible economies in English coal.

The Utilization of Coal (75878 A). J. D. McArthur. From a paper read before Inst. of Metals. 1600 w. Mech Wld—Dec. 22, 1916. Serial, 1st part. Calls attention to waste.

The Water Content of Coal, with Some Ideas on the Genesis and Nature of Coal (76585 B). Edward Mack and G. A. Hulett. Ills. 22 pp. Am Jl Sci—Feb., 1917. Attempt to define the true moisture content of coals.

Importance of Coal in War (78790). D. H. McDougall. 2500 w. Can Min Jl—May 15, 1917. Presidential address at the Nova Scotia Min. Soc. Problems of coal producers.

Our Mineral Supplies—Coal (78677). C. E. Lesher. 2800 w. U S Geol Surv—Bul 666-M. Present conditions; shortage; appeal to consumers.

Federal Trade Commission Report on Coal (78844). 3000 w. Ry Age Gaz—May 25, 1917. Present conditions in bituminous coal trade and remedies proposed.

Coal—A War Necessity (79041). Franklin K. Lane. 2000 w. Cl Age—June 2, 1917. Address to the Coal Production Committee of the Council of National Defense.

Coal Specifications. (81798). 3500 w. Prac Eng, Chi—Oct. 15, 1917. Why they are used and how abused.

Storage, Weathering and Spontaneous Combustion of Coal. (81803 A). 3000 w. Met & Chem Eng—Oct. 15, 1917. Facts bearing on coal storage and protection against losses.

The Oxidizable Constituents of Coal. (81694 A). J. Ivon Graham. Ills. 4000 w. Colly Gdn—Sept. 14, 1917. Serial, 1st part. Abstract of paper before Inst. of Min. Engrs. Research work on the spontaneous combustion of coal. Conditions of danger.

A Contribution to the Micro-Petrology of Coal (80489 N). George Hickling, with discussions. Plates. 22 pp. Instn Min Engrs, Trans—July, 1917. Describes the chief elements regarded as constituents of coals; relation between plant-tissues and actual coal substance, etc.

**Coal Analysis**

A New Method of Coal Analysis (80972 A). H. Gröppel, in *Chemiker Zeitung*. Ills. 1500 w. Colly Gdn—Aug. 17, 1917. Proposed modification of present methods of determining ash, moisture, yield of coke and tar in coal.

**Coal Cars**

Making Coal Cars in Mines Safe. (81918). Carl Scholz. Ills. 1500 w. Cl Age—Oct. 20, 1917. How to build a car so as to remove the risks which are inherent in the coupling of cars and transportation of coal.

**Coal Carbonization**

The Effect of Temperature and Duration of Reaction on the Formation of Light Oils in Coal Carbonization at Atmospheric Pressure (77148 B). M. C. Whitaker and W. R. Crowell. Ills. 6500 w. Jl Ind & Eng Chem—March, 1917. Investigations and conclusions.

**Coal Cost**

The Cost of Coal (77282 B). George Otis Smith and C. E. Lesher. 6000 w. Econ Geol—Jan., 1917. Analysis of cost elements that enter into the price of coal.

**Coal Cutting**

Coal Cutting in Western Kentucky Mines (76112). H. M. Ernst. Ills. 2200 w. Cl Age—Jan. 20, 1917. Average tonnage undercut at some mines is 150 and 250 tons per machine shift.

Points Met with in Practice with Coal-Cutters (77421 A). David Sharp. Read before Nat. Assn. of Col. Mgrs. 5500 w. Ir & Cl Trds Rev—March 2, 1917. Points to be considered in choosing a machine; power consumption; upkeep, etc.

**Coal Distillation**

La Distillation De La Houille Dans Le Vide (74896 B). A. Pictet. 4700 w. Rev Gen Sci—Oct. 30, 1916. Distillation of coal in a vacuum. Characteristics of products.

**Coal Dust**

Coal Dust Experiments in the Derne Gallery (74978 A). From *Glückauf*. 3000 w. Colly Gdn—Nov. 10, 1916. Minimum quantity of coal dust capable of explosion investigated, and anti-explosion devices.

**Coal Economy**

Coal and Its Economic Utilization (76390 A). John S. S. Brame. 1200 w. Ir & Cl Trds Rev—Jan. 12, 1917. Output and consumption, and reserves, suggesting means of reducing waste.

**Coal Export**

Progress in the Export Trade (75945). J. S. Burrows. 3500 w. Cl Age—Jan. 13, 1917. Review of past year.

**Coal Fields**

Gaseous Mines in the Crow's Nest Pass Coal Field (75048). Thomas Graham. Ills. 2500 w. Cl Age—Dec. 2, 1916. Collieries in British Columbia and terrible outbursts of gas.

Yampa Coal Field in Colorado (78002). F. W. Whiteside. Ills. 2200 w. Cl Age—April 14, 1917. A promising field. Difficult transportation problems.

Areas of Deposition of the Coal Fields of Western Europe. (81961 A). G. Blake Walker, with discussion. Ills. 7000 w. Colly Gdn—Oct. 5, 1917. Geological study of the carboniferous period and the disturbances of the coal beds, and how the effects are observed.

Mount Mulligan Coalfield. (81953 N). Lionel C. Ball. Ills. 9 pp. Qnsd Gov Min Jl—Sept., 1917. Recent surface and underground developments and future prospects.

**Coalfields**

The Natal Coalfields—Phases in Development (80542 N). William Taylor Heslop. 2500 w. Chem, Met, & Min Soc of S Af, Jl—May, 1917. Historical review of the development.

The Bristol and Somerset Coal Fields: Effect of Master Folds on structure (74304 A). Ernest H. Staples. 4000 w. Colly Gdn—Oct. 13, 1916. Geological study.

The Coal Seams of South Yorkshire (74489 A). W. G. Fearnsides. From *Pro. of Sheffield Soc. of Engrs. & Met.* Map. 3500 w. Colly Gdn—Oct. 20, 1916. Relative importance of the individual seams, occurrence, etc., with other information.

The South Staffordshire Coalfield (81184 A). 2000 w. Ir & Cl Trds Rev—Aug. 31, 1917. Probability of considerable extensions disclosed by recent investigations.

**Coal Gas**

See same heading under MECHANICAL ENGINEERING, *Automobiles*.

**Coal Handling**

Modern Coal Handling (75831). Henry J. Edsall. Ills. 2500 w. Nat 9ngr—Jan., 1917. Service requirements and details.

**Coal Industry**

Market and Shipping Conditions on Atlantic Coast in 1916 (75943). G. G. Wolkins. 6 pp. Cl Age—Jan. 13, 1917. Year of constant disturbance.

Real Cause of Present Coal Prices (76286 A). Gerald B. Gould. 1500 w. Ind Man—Feb., 1917. High prices not caused by scarcity of labor shortage.

Coöperation, Conservation, and Competition in the Coal Industry (76767). E. W. Parker. 3000 w. Cl Age—Feb. 17, 1917. Address before Am. Min. Cong.

**Coal Investigations**

Extraction of Coal by Solvents (74569 A). F. Fischer and W. Gluud, in communication to Kaiser Wilhelm Inst. for Coal Investigation. 5600 w. Colly Gdn—Oct. 27, 1916. Summary of previous work and experiments with benzol and sulphurous acid.

**Coal Markets**

The Foreign Coal Markets (79261). A. T. Shurick. 5000 w. Cl Age—June 16, 1917. Annual review of the coal situation in the different countries.

**Coal Measures**

The Western Interior Geosyncline and Its Bearing on the Origin and Distribution of the Coal Measures (77077 C).

Francis M. Van Tuyl. Ills. 1700 w. Jl Geol—Feb.-March, 1917. Deformations in the Mississippi valley.

**Coal Mining**

Effects of Modern Labor Movements and Legislation on the Economic Position of Coal Mining (75142 A). 2500 w. Ir & Cl Trds Rev—Nov. 17, 1916. From presidential address of William Pickup, to the Manchester Geol. and Min. Soc.

Good Results Secured in the Pittsburgh Seam (75474). Thomas Brennan. 2000 w. Cl Age—Dec. 23, 1916. System that reduces cost and improves production.

Tenure of Coal Areas (75046). J. F. K. Brown. 3000 w. Cl Age—Dec. 2, 1916. Systems developed and their merits.

The Effect of Modern Labor Movements and Legislation on the Economic Position of Coal-Mining (76891 N). William Pickup. Presidential address. 10 pp. Instn Min Engrs, Trans—Jan., 1917. Reviews conditions in Great Britain.

**Coal Rates**

Coal Rates and New-Business Policy (80457). 2000 w. Elec Wld—Aug. 11, 1917. Reports from Central West.

**Coal Storage**

Lump-Coal Storage and Reclaiming Plant (79397). H. M. McFarland. Ills. 1500 w. Cl Age—June 23, 1917. Provision for storing coal on the ground, and manner of operating rotary coal dump.

**Coal Supply**

The National Coal Supply (74578 A). 7000 w. Ir & Cl Trds Rev—Oct. 27, 1916. Conferences in London to consider production and best steps to augment the output.

Looking Ahead on the Coal Supply (80325). Ills. 1500 w. Elec Wld—Aug. 4, 1917. Solutions suggested in central western states.

Gas Works and Coal Economy (80733). 1100 w. Times Eng Supp—July 27, 1917. Recent requirements in England by reason of war necessity.

**Coal-Tar Colors**

The British Coal-Tar Color Industry and Its Difficulties in Time of War (75620 A). C. M. Whittaker, with discussion. 10000 w. Roy Soc Arts, Jl—Dec. 8, 1916. A review of the development and present conditions.

**Coal Trade**

Coal Trade in New York in 1916 (76113). 3000 w. Cl Age—Jan. 20, 1917. Heavy demand at the opening period with record-breaking prices at the closing period.

Business Aspects of the Coal Industry in 1916 (75942). A. T. Shurick. 5500 w. Cl Age—Jan. 13, 1917. Review of demand and production, and general conditions.

Coal Trade in Nova Scotia in 1916 (76683 N). F. W. Gray. 1500 w. Can Min Inst, Bul—Feb., 1917. Lowest production since 1910.

Scientific Methods of Coal Buying (76875). John B. C. Kershaw. 3000 w. Cl Age—Feb. 24, 1917. Serial, 1st part. Survey of methods used in different countries, with special reference to Europe.

The Coal Trade in Nova Scotia During the First Half of 1917 (80461 N). F. W. Gray. 1000 w. Can Min Inst,Bul—Aug., 1917. Features of the year and report of production.

**Coal Washer**

A New Belgian Coal Washer (74737 A). Ills. 3000 w. Colly Gdn—Nov. 3, 1916. Washer known as the "Rheolaveur," as described by M. E. Dinoire, in *Bul. de la Soc. de l'Ind. Min.*

The Principles of Coal Washing (78204 A). Dr. Henry Louis, with discussion. Abstract of address at meeting of Coke-Oven Manager's Assn. 3500 w. Colly Gdn—April 5, 1917. General principles upon which coal-washing machines are made.

Observations on Modern Coal Washing (80073). G. H. Elmore. Ills. 3500 w. Cl Age—July 21, 1917. Recent improvements in coal washing.

Notes on Coal Washing Experiments (80761 A). J. Pascal. Ills. 3500 w. Colly Gdn—Aug. 10, 1917. Methods of testing and results.

**Coke**

Coke in 1915 (76311 N). C. E. Lesher. 44 pp. U S Geol Surv, II:26—Dec. 14, 1916. Review of industry, production, by-products, etc.

By-Product Plant at Sheet & Tube Works (75832). Charles C. Lynde. Ills. 1800 w. Bt Fc & Stl Pt—Jan., 1917. New plant at Youngstown.

The Coal and Coke Trades of the United Kingdom in 1916 (75985 A). 17000 w. Ir & Cl Trds Rev—Dec. 29, 1916. District reviews.

The Coal Trade of 1916 (76140 A). 29500 w. Colly Gdn—Jan. 5, 1917. Reviews by districts and months.

The Middle Western Markets in 1916 (76114). 4500 w. Cl Age—Jan. 20, 1917. Shipments greatly increased. Prices high.

The Coke Industry of New South Wales (76840 A). L. F. Harper and J. C. H. Mingaye. Ills. 4500 w. Colly Gdn—Feb. 2, 1917. Serial, st part. Review of development, types of ovens, etc.

By-Product Coke and Coking Operations (78117 B). C. J. Ramsburg and F. W. Sperr, Jr. Ills. 40 pp. Fkn Inst, Jl—April, 1917. Theory of the coking process with studies of coke.

**Coke-Oven Bricks**

Physical Properties of the Materials of Coke Oven Bricks (76839 A). W. G. Fearnsides. From a paper before Coke Oven Mgrs. Assn. 5500 w. Colly Gdn—Feb. 2, 1917. Physical behavior of the constituent minerals.

**Coke Ovens**

Direct Recovery of Ammonia (74888). 1700 w. Times Eng Supp—Oct. 27, 1916. Processes described in British Government report.

Machinery for Mitchell Type of Rectangular Coke Oven (74527). H. V. Schiefer. Ills. 2500 w. Cl Age—Nov. 11, 1916. Details of coke-handling machinery recently installed.

By-product Coke Ovens on Jersey Meadows Built Inside Temporary Steel Sheds (75179). Ills. 1500 w. Eng Rec—Dec. 9, 1916. Details of plant founded on piles in soft mud.

Youngstown's New Coke Oven Plant (75114 A). Ills. 3300 w. Iron Age—Dec. 7, 1916. Interesting features.

The Cement Gun in Oven Repairs (76874) H. V. Patterson. 1200 w. Cl Age—Feb. 24, 1917. Methods of repairing cracks in linings of by-product coke ovens.

Chemical Aspects of Coke Oven Practice (77009 A). P. Phillips Bedson. 1800 w. Colly Gdn—Feb. 9, 1917. From address to the Coke Oven Mgrs. Assn. Development in the practice of coking with the recovery of by-products.

**Coking**

Coking Coal Industry in Harlan County, Kentucky (75351). J. R. Foster. 1000 w. Cl Age—Dec. 16, 1916. Installation of 408 standard beehive ovens.

Problems in By-product Coking (75197). 2000 w. Cl Age—Dec. 9, 1916. Much to be learned in the solution and proper mixing of coals.

Recent Developments in the By-Product Coking Industry of Japan (79243 A). T. Kurahashi. Ills. 1500 w. Met & Chem Eng—June 15, 1917. With some data on the dyestuff industry, which uses the by-products.

The Design of Modern Coking Plants (80875 A). E. M. Myers. Abstract of paper read before British Coke Oven Mgrs. Assn. 1500 w. Met & Chem Eng—Sept. 1, 1917. Important features governing the selection of the type of oven; systems of by-product recovery, etc.

Coking of Illinois Coals. (81673 AV). F. K. Ovitz. Ills. 60 pp. U S Bur Mines—Bul 138. Report of Illinois Coal-mining investigations co-operative agreement.

**Collieries**

Economical Production and Utilization of Power at Collieries (75132 A). F. F. Mariet. 2500 w. Mech Wld—Nov. 24, 1916. Serial, 1st part. From paper before Midland Inst. of Min., Civ., and Mech. Engrs. Subject discussed under five heads.

The Mechanical Equipment of Cwm Colliery, Llantwit Fardre, South Wales (75396 A). T. Campbell Futers. Ills. & Plate. 4000 w. Colly Gdn—Dec. 1, 1916. Details of this new colliery and its equipment.

The Economical Production and Utilization of Power at Collieries (75306 N). F. F. Mairet, with discussion. 55 pp. Instn Min Engrs, Trans—Nov., 1916. Subject is discussed under five heads. Aims at diminishing consumption of coal.

Equipment of the Valleyfield Colliery (75133 A). Ills. 2500 w. Colly Gdn—Nov. 17, 1916. A 500 k. w. Brush turbo plant.

Coedely Colliery (75632 A). Ills. 2500 w. Ir & Cl Trds Rev—Dec. 8, 1916. History and description.

Electrical Experience at Collieries (75658 A). Chris. Jones. Ills. Read before a joint meeting of Nat. Assn. of Col. Mgrs. 7000 w. Ir & Cl Trds Rev—Dec. 15, 1916. Serial, 1st part. Detailed discussion of problems solved.

Collieries and Coking Plant at the Decazeville Iron Works (78048 A). M. Leveque. Ills. 2500 w. Colly Gdn—March 23, 1917. From *Bul de la Soc. de l'Ind Min.* Deposit, methods of mining, etc.

Remodelling an Old Colliery (78217 A). Ills. 2000 w. Ir & Cl Trds Rev—March 30, 1917. Victoria Colliery, Ebbro Vale, England.

Successful Colliery Management (77891). H. M. Crankshaw. Ills. 4500 w. Cl Age—April 7, 1917. Requirements, problems and their solution.

Whitehaven Colliery Company's Developments (77920 A). Ills. 4000 w. Ir & Cl Trds Rev—March 16, 1917. New shafts and pits, with plan of arrangement of pit-bottoms, etc.

The Frickley Colliery of the Carlton Main Colliery Company, Limited (81698 A). Ills. 3000 w. Ir Cl Trds Rev—Sept. 21, 1917. Surface and Underground plants described.

**Colorado**

The Coal Industry of Colorado (74600 N). Ralph W. Shumway. 5000 w. Col Sl Min Qt—April, 1916. Factors affecting the industry.

**Conveyors**

Coal-Face Conveyors Employed in the United Kingdom (74415). Sydney F.

Walker. Ills. 3000 w. Cl Age—Nov. 4, 1916. Serial, 1st part. Two types described.

Recovery of Coke Breeze at Skip Hoists (80834 A). Ills. 1500 w. Iron Age—Aug. 30, 1917. Pneumatic conveyor carries breeze to storage tanks. Automatic control features.

**Cost of Coal**

Pennsylvania Commission Reports on the Increased Cost of Coal (76876). 3300 w. Cl Age—Feb. 24, 1917. Exhaustive analysis.

The Cost of Coal (75071 A). George Otis Smith and C. E. Lesher. Read before Am. Min. Cong. 5000 w. Met & Chem Eng—Dec. 1, 1916. Four items of cost discussed and possibilities of lower costs.

**Decking Plant**

Hydraulic Decking Plant at the Great Western Colliery Company's Corn Pit (78202 A). T. Campbell Futers. Ills. 800 w. Colly Gdn—March 30, 1917. Particulars of plant installed at Mildred pit.

**Deposits**

The Tonnage Available (75193). J. F. K. Brown. Ills. 3500 w. Cl Age—Dec. 9, 1916. Serial, 1st part. How determined; deductions necessary.

The Coal Deposits of Reefton, New Zealand. (81714 A). J. Henderson. 3500 w. Colly Gdn—Sept. 21, 1917. Origin of seams, distribution, coal composition, etc.

**Distillation**

La Distillation De La Houille (80049 B). Ills. 1500 w. Gen Civ—July 7, 1917. Distillation of coal at low temperature. Review of methods and composition of distillates.

Sulla Distillazione Del Litantrace A Temperature Ridotta (81380 B). Ills. 1800 w. Ind—Aug. 11, 1917. Apparatus for the distillation of coal at low temperatures.

**Drilling**

New Thin-Seam Mounting For Jackhammers (80076). H. L. Hicks. Ills. 1500 w. Cl Age—July 21, 1917. Detailed description.

**Dynamometer Car**

A Coal Mine Dynamometer Car (74418). Ills. 1000 w. Cl Age—Nov. 4, 1916. Requirements and design.

**Electrical Apparatus**

Double-pressure Testing of Colliery Electrical Apparatus (81183 A). L. Fokes. Ills. 3500 w. Ir & Cl Trds Rev—Aug. 31, 1917. Apparatus and methods for testing.

**Electrical Equipment**

Suggested Safety Rules for Installing and Using Electrical Equipment in Bituminous Coal Mines (76352). H. H. Clark and C. M. Means. 22 pp. U S Bur Mines—Tech paper 138.

Pioneer All-Electric Coal Mine (76027). Ills. 2000 w. Prac Eng, Chi—Jan. 15, 1917. Equipment and operation.

**Electric Power**

Electric Supply to Collieries (79854 N). G. S. Corlett. 14 pp. Instn Min Engrs, Trans—May, 1917. Conditions under which the supply is usually furnished and considerations affecting the cost.

**Electrification**

Electrification of a Group of Collieries (78218 A). Harold Green. Ills. 8500 w. Ir & Cl Trds Rev—April 6, 1917. Gradual change from steam to electrical driving in a group of eight collieries.

**Explosions**

Inflammability of Carbonaceous Dusts (77149 B). H. H. Brown. Ills. 4500 w. Jl Ind & Eng Chem—March, 1917. Methods of testing and results.

Gas Explosions in Crowsnest Coalfield (81751). James Ashworth. Also Geo. H. Rice's recommendations for permanent commission. 5500 w. Can Min Jl—Oct. 1, 1917. Account of the sudden and violent outbursts showing the need of research work in this field.

**Explosives**

Drilling and Shooting Coal (79167). F. C. Pick. 2500 w. Cl Age—June 9, 1917. Suggests the employment of a crew of picked men for this work.

**Fife**

Notes on the Fife Coal Field (76548 A). 2500 w. Colly Gdn—Jan. 19, 1917. Descriptive outline.

**France**

Les Houillères Françaises Durant La Guerre (74917 B). A. Pawlowski. Ills. 2100 w. La Nat—Oct. 28, 1916. Operation, methods and output of French coal mines during the war.

The Coal Situation in France (77540). 3000 w. Cl Age—March 24, 1917. Review of current situation and outlook.

**Fuel**

Brandstofverbruik van gas-en electriciteits-berrijven (76936 B). H. J. H. Erens. 1800 w. Ingr—Jan. 20, 1917. Reviews of fuel consumption in Holland for gas and for electric energy.

Output and Value of Fuel in 1915 (77244 A). 1200 w. Colly Gdn—Feb. 23, 1917. From general report on mines and quarries for 1915.

Vigorous and Concerted Effort by Coal Miners Necessary to Provide Wartime Supply of Fuel (79682 A). Franklin K. Lane. 1800 w. Gen Elec Rev—July, 1917. Address before the Coal Production Committee.

Combustibli Nazionali (79445 B). P. Lanino. 2200 w. Ind—June 3, 1917. Production of coal and lignite in Italy. Possibilities of further development.

Coal Concreted from Dusts of Ashes (80532 A). R. Goulburn Lovell. 1000 w. Colly Gdn—July 27, 1917. Processes described.

Conferenze Sulla Questione Del Combustible (80702 B). G. Perelli. 7600 w. Ind—July 21, 1917. Report to the Scientific Technical Committee of Italy on fuel conservation and supply.

In Argomento Di Combustibili (80703 B). M. Böhm. Ills. 4600 w. Mon Tec—July 10, 1917. Further discussion of Italy's fuel supply in a report to the Scientific Technical Committee.

In Argomento Di Combustibili (80742 B). G. Perelli. 2600 w. Mon Tec—July 20, 1917. Serial, 1st part. Another communication of the Italian Technical Committee on fuel supply.

The Use of Low-Grade Mineral Fuels and the Status of Powdered Coal (80229 A). F. Parkman Coffin. 25 pp. Gen Elec Rev—Aug., 1917. First of a series of articles on methods for more efficiently utilizing our fuel resources. Present article deals with coal deposits in North America; low-grade fuels; methods of burning, etc.

Fuel Research in 1915-16 (81129 A). Dr. W. Bertelsmann, in *Chem. Zeit.* 3500 w. Colly Gdn—Aug. 31, 1917. Summary of inventions and researches relating to peat, coal, brown coal, briquettes, and fuel utilization.

Les Combustibles (81395 B). Louis Bourgoin. 8300 w. Rev Tri Can—Aug., 1917. Comparison of the availability and thermal value of natural and artificial fuels; solid, liquid and gaseous.

Fuel Economy. (81693 A). 2500 w. Mech Wld—Sept. 14, 1917. Extracts from paper by J. A. Robertson directing attention to the urgent necessity of properly utilizing Britain's coal resources to meet war conditions.

See same heading under MECHANICAL ENGINEERING, *Steam Engineering*.

**Fuel Economy**

Sull' Impiego Di Combustible Nelle Varie Operazioni Technologiche (80004 B). F. Massarelli. 2000 w. Ind—June 11, 1917. Recommendations of Italian National Committee for fuel economy in industry.

**Fuel Resources**

A National Fuel and Power Policy (75893 A). H. E. Armstrong. Abstract of lecture at Nottingham Univ. College. 3000 w. Colly Gdn—Dec. 22, 1916. Need of reform in England. Outlines policy.

**Gas Ignition**

Risk of Gas Ignition by Underground Magneto Telephones (80410 A). L. Fokes. Ills. 1000 w. Ir & Cl Trds Rev—July 20, 1917. Report of tests and results.

**Gas Producers**

Operating Details of Gas Producers (76002). R. H. Fernald. 62 pp. U S Bur Mines—Bul 109. Fuel and methods.

**Germany**

Germany's Coal Deposits (77651 A). 2000 w. Engng—March 9, 1917. Serial, 1st part. Present article deals with the western district.

**Gob Fires**

Methods of Dealing with Gob Fires (80411 A). S. J. Bridges. Ills. 2000 w. Ir & Cl Trds Rev—July 20, 1917. Methods employed.

**Haulage**

Line and Return Troubles in the Haulage Systems of Coal Mines (76338). I. Rowland Brown. Ills. 3000 w. Cl Age—Jan. 27, 1917. Requirements.

The Sterling Coal Mine (77709). Wilbur Greeley Burroghs. Ills. 200 w. Cl Age—March 31, 1917. Highly developed haulage system.

The Effect of Anti-Friction Bearings on the Haulage of a Coal Mine (79858 D). P. B. Liebermann. 12 pp. A I M E, Bul—July, 1917. Investigation of flexible roller bearings in comparison with ordinary plain bearings.

Interesting Electric System of Haulage at a Coal Mine (80906). Frank Hoskinson. Ills. 4000 w. Cl Age—Sept. 11, 1917. Serial, 1st part. Details of the "old" and the "new" system.

**Hoisting**

Counterbalance and Equalization of the Load in Hoisting. (81512). H. D. Pallister. Ills. 3000 w. Cl Age—Sept. 29, 1917. Methods used in various coal fields.

**Holland**

Le Charbon Et Le Fer En Hollande (74904 B). 2000 w. Gen Civ—Nov. 4, 1916. Review of coal and iron production and exportation from Holland.

**Illinois Coal**

The Coal Industry of Illinois (81222 D). C. M. Young. Map. 15 pp. A I M E, Bul—Sept., 1917. Facts concerning the present condition and future prospects.

**India**

Goaf Packing at the Mohpani Mines (75892 A). F. L. G. Simpson. From *Trans. of Min. & Geol. Inst. of India.* Ills. 3500 w. Colly Gdn—Dec. 22, 1916. Practiced in only two mines of India.

**Indo-China**

Les Ressources De L'Indo-Chine (80026 B). H. Brenier. Ills. 2200 w. La Nat

—June 30, 1917. Natural resources of Indo-China, especially coal.

**Inferior Coals**

The Low Temperature Distillation of Inferior Coals (81363 A). T. F. Winmill. Ills. 2500 w. Ir & Cl Trds Rev—Sept. 7, 1917. Apparatus used and methods of working. Concluding that the method is useless as a means of utilizing waste fuels of high ash content.

**Inspection**

Coal Mines Inspection in 1916. (81847 A). 10500 w. Colly Gdn—Sept. 28, 1917. Reports from different divisions.

**Japan**

The Coalfields and Coal Industry of Japan (80091 A). 5000 w. Engng—July 6, 1917. The deposits and their development.

**Kentucky**

New Coal-Mining Development in Kentucky (78914). Ills. 1200 w. Cl Age—May 26, 1917. Details of the workings of a modern operation in the Harlan County field.

**Laboratory**

Laboratory of the Consolidation Coal Co. (80478). H. A. Williamson. Ills. 1200 w. Cl Age—Aug. 11, 1917. New chemical laboratory at Fairmont, W. Va., and its equipment.

**Lignite**

Le Risorse Di Lignite in Italia (77590 C). Ills. 1500 w. Ingeg Ferro—Jan. 31, 1917. Italy's supply of lignite, or brown coal.

L'Utilisation Du Lignite Comme Combustible (78254 B). D. Bellet. 5500 w. Rev Gen Sci—Feb. 28, 1917. Distribution in Europe, mining, and industrial uses.

The Utilization of Brown Coal (80685 N). J. L. Strevens. 2000 w. Min & Eng Rev—July, 1917. Serial, 1st part. Present article considers the subject generally, and also briquetting.

The Utilization of Lignite in Texas (80581). William B. Phillips. 1500 w. Mfrs' Rec—Aug. 16, 1917. Suggests methods of using these lignites.

Low-Grade Fuels for Power (81418). 1900 w. Times Eng Supp—Aug. 31, 1917. Application of experience in the United States to British Empire in utilization of lignite and wood refuse.

Low Temperature Distillation of Lignite Coal. (81565 B). H. K. Benson and L. L. Davis. Ills. 1500 w. Jl Ind & Eng Chem—Oct., 1917. A study of Washington lignite coal to determine the yield of oil and the relation of the temperature of distillation.

**London**

Distribution of House Coal in the Metropolis (80985 A). Ir & Cl Trds Rev—Aug. 17, 1917. Summary of the official order for London.

**Longwall**

Longwall at a North of England Mine (77057). T. Goldon. Ills. 1200 w. Cl Age—March 3, 1917. Arguments for and against this method.

Longwall Mining in Northern Illinois (79778). Edward T. Bent. Ills. 1500 w. Cl Age—July 7, 1917. Account of this method which is successful only where physical conditions are favorable.

**Low-Grade Fuel**

Low Grade Fuels (78871). 2000 w. Times Eng Supp—Apr. 27, 1917. Suggested methods of using coke dust and other low-grade fuels.

**Merit Rating**

Merit Rating of Coal Mines Under Workmen's Compensation Insurance. (81590 D). E. C. Lee. 8 pp. A I M E, Bul—Oct., 1917. Effect on the mine safety problem.

**Miners**

The Mexican as a Coal Miner (80777). P. L. Mathews. Ills. 2500 w. Cl Age—Aug. 25, 1917. Believes he can be developed into an able coal worker.

**Mining Methods**

Observation on the Order of Working the Coal Seams in the North of England (78828 A). William D. Harbit. Read before Nat. Assn. of Col. Mgrs. 5000 w. Ir & Cl Trds Rev—May 4, 1917. Serial, 1st part. Particulars of working under a variety of conditions.

Working Dirty Beds of Coal (78753). Rowland Gascoyne. 1500 w. Cl Age—May 19, 1917. Methods favored.

New Methods for Mining Bituminous Coal as Practiced by the H. C. Frick Coke Company (74672 B). Patrick Mullen. Ills. 1600 w. Engrs' Soc West Penn, Pro—Nov., 1916. Application of shortwall mining machines to the extraction of rib coal.

Tipple and Mining Methods at Hisylvania Mine No. 22 (76336). Wilbur G. Burroughs. Ills. 1800 w. Cl Age—Jan. 27, 1917. Unusual tipple construction.

Methods of Working a 3-ft. Bed of Coal Pitching 10 to 20 Deg. (76649). Samuel Dean. Ills. 6500 w. Cl Age—Feb. 10, 1917. Read before Rocky Mt. Coal Mining Inst. Methods and equipment.

Mining a 60-Ft. Vein of Coal in Transylvania (76770). Emanuel Dufranne. Ills. 1100 w. Cl Age—Feb. 17, 1917. Mostly open-cut workings. Compressed air for power.

New Methods for Mining Bituminous Coal as Practiced by the H. C. Frick Coke Company (77273 B). 16 pp. Engrs' Soc West Penn, Pro—Dec., 1916. Discussion of Patrick Mullen's paper.

American Notes. (81695 A). Samuel Dean. From paper before Inst. of Min Engrs. 3500 w. Colly Gdn—Sept. 14, 1917. Coal mining methods and conditions.

**Mine Fires**

How a West Virginia Mine Fire Was Placed Under Control (76650). C. H. Tarleton. Ills. 2500 w. Cl Age—Feb. 10, 1917. Difficulties explained and their solution.

Some Notes on Explosions of Fire Damp, and Occurrences of Gob Fires in Natal. (81825 N). J. E. Vaughan and F. A. Steart. Ills. 5800 w. Chem Met & Min Soc S. Af Jl—June, 1917. Past experiences in Natal.

**Mine Gas**

The Movement of Mine Gas in Coal and Surrounding Rock (76141 A). M. N. Charnitzyn. 2000 w. Colly Gdn—Jan. 5, 1917. Losses of gas, movement.

**Mine Inspectors**

Pennsylvania Bituminous Mine Inspectors Given Life Tenure of Office (80479). Frank Hall. 1800 w. Cl Age—Aug. 11, 1917. Brief review of history of mine inspection legislation in the state of Pennsylvania.

**Mine Power**

Electricity vs. Other Power for Coal Mines (77546). Cornelius Weber. 2000 w. Elec Wld—March 24, 1917. Results and costs of operation with steam, electricity, air, etc.

**Mine Surveying**

Surveying Methods in the Anthracite Regions (77710). 3000 w. Cl Age—March 31, 1917. Methods adopted by one of the large companies.

**Mine Timber**

Some Practical Notes on the Economical Use of Timber in Coal Mines (78573 A). F. C. Lee. From paper before N. of Eng. Inst. of Min. & Met. Ills. 4000 w. Colly Gdn—Apr 20, 1917. Suggestions for economical utilization of the timber resources.

**Mine Tracks**

Location and Construction of Mine Tracks (80194). J. McCrystle. Ills. 3000 w. Cl Age—July 28, 1917. Serial, 1st part. Original and valuable data.

**1916**

Reviews of Coal Mining for 1916 (75940). Ills. 23 pp. Cl Age—Jan. 13, 1917. Reports from coal producing states.

**Nitric Acid**

Nitric Acid From Coal Gas (80040). 1000 w. Times Eng Supp—June 29, 1917. The Hausser process, developed in Germany.

**Nova Scotia**

Coal Trade of Nova Scotia During 1916 (76104). F. W. Gray. 2500 w. Can Min Jl—Jan. 15, 1917. Resume and retrospect.

**Oxidation**

Iron Pyrites and the Oxidation of Coal (74491 A). T. J. Drakeley. 2500 w. Colly Gdn—Oct. 20, 1916. Experiments to ascertain the effect of iron pyrites on coal, with results.

The Absorption of Oxygen by Coal (77453 N). J. Ivon Graham. Ills. 2500 w. Instn Min Engrs, Trans—Feb., 1917. Part X deals with the formation of water in the oxidation of coal.

**Pacific Coast**

See same heading under ELECTRICAL ENGINEERING, *Generating Stations*.

**Peat**

Peat Distillation (75585). 1200 w. Times Eng Supp—Nov. 24, 1916. A new method, utilizing low temperature.

Peat in 1915 (75997 N). James S. Turp. 1500 w. U S Geol Surv, II : 34—Dec. 30, 1916. Distribution, utilization, production, etc.

Investigation of the Peat Bogs and Peat Industry of Canada, 1913-14 (76711 N). Aleph Anrep. Ills. & Maps. 179 pp. Can Dept Mines, Bul 11—No. 351.

Peat and Its Utilization (77228). R. O. Wynne-Roberts. 1500 w. Can Engr—March 8, 1917. Analysis of the peat situation in Canada with suggestions for more general use.

Turf als brandstof Voor Locomotieven (77562 B). F. L. Haider. 1900 w. Ingr—Feb. 3, 1917. Peat for locomotive fuel. Results from its use in Sweden.

Utilization of Peat for the Production of Sulphate of Ammonia and of Power (77634). Louis Simpson. Ills. 4500 w. Can Min Jl—March 15, 1917. Serial, 1st part. Description and data.

L'Industrie De La Tourbe (79424 B). Louis Renié. Ills. 3300 w. La Nat—May 26, 1917. Methods and machinery used in Sweden and other countries for obtaining and treating peat.

Irish Peat (80734). 900 w. Times Eng Supp—July 27, 1917. Increasing utilization of peat for fuel due to constant rise in cost of coal.

Raising Steam from Peat (81419). 1300 w. Times Eng Supp—Aug. 31, 1917. Abstract of Bul. 17, Canada Dept. Mines, giving tests and particulars.

See also Powdered Peat, under RAILWAY ENGINEERING, *Motive Power and Equipment*.

**Permeability**

The Permeability of Coal to Air or Gas, and the Solubilities of Different Gases in Coal (77452 N). J. Ivon Graham. 4800 w. Instn Min Engrs, Trans—Feb., 1917. Experiments and results.

**Pillar Extraction**

Pillar Extraction in Thick Seams (82070). R. W. Magraw. Ills. 3500 w. Cl Age—Oct. 27, 1917. Conditions in the Utah coal field and method used.

**Powdered Coal**

Pulverized Coal as a Metallurgical Fuel (74393). James Wheeler Fuller. 5000 w. Blt Fc & Stl Pt—Nov., 1916. Treatment of coal for economical and effective use.

**Power Plants**

New Power Plant of the Susquehanna Coal Co. (76651). C. H. Beidenmiller. Ills. 1800 w. Cl Age—Feb. 10, 1917. Plant under construction at Nanticoke, Penna.

**Prices**

Official Directions as to the Sale of Coal (79982 A). 3000 w. Ir & Cl Trds Rev—June 29, 1917. Code issued by the Controller of Coal Mines in the United Kingdom.

Retail Coal Prices Order (81697 A). 1500 w. Colly Gdn—Sept. 14, 1917. Recent order of British Board of Trade.

**Producer Gas**

Producer Gas and Its Industrial Uses (79100 A). F. W. Steere. From a paper read before the Soc. of Detroit Chemists. 2500 w. Iron Age—June 7, 1917. Possibilities of one of the methods of utilizing soft coal, to conserve natural fuel.

**Production**

Efficiency of Coal Production (79776). C. B. Officer. 2200 w. Cl Age—July 7, 1917. How to secure maximum output.

**Profits**

The Profits of Coal Mining (74427). F. W. Gray. 1000 w. Can Min Jl—Nov. 1, 1916. Critical discussion of methods.

**Pulverized Coal**

See Fuels, under MECHANICAL ENGINEERING, *Steam Engineering.*

**Pumping Engine**

Eighteenth Century Colliery Pumping Engine (76554 A). Ills. 2500 w. Engr—Jan. 19, 1917. An interesting old engine of the atmospheric type.

Notes on an Old Colliery Pumping Engine (1791). (78694 N). William Thomson Anderson, with discussion. Ills & Plate. 50 pp. Instn Min Engrs, Trans—April, 1917. The Pentrich engine.

**Pyrite**

The Iron Pyrite Found in Coal (75742). C. M. Young. Ills. 3000 w. Cl Age—Jan. 6, 1917. Possibilities of merchandising the pyrite.

**Queensland**

Coal at Oxley Creek, Hughenden District (77025 N). Jno. H. Reid. Ills. 4000 w. Qnsd Gov Min Jl—Jan. 15, 1917. Geological survey report.

**Regenerative Ovens**

Physical Conditions Relative to the Heating of Regenerative Ovens (80409 A). D. Bagley. Ills. 2800 w. Ir & Cl Trds Rev—July 20, 1917. Details of regenerative coke ovens and their control.

**Research Work**

Coal Mining Investigations (80480). 2500 w. Cl Age—Aug. 11, 1917. Serial, 1st part. Summary of research work done by the U. S. Bureau of Mines. Prevention of coal-dust explosions.

**Sampler**

The Ramsay Mine-Run Sampler (77893). H. S. Geismer. Ills. 1200 w. Cl Age—April 7, 1917. Details of an efficient device.

**Sampling**

Triplicate Sampling of Coal (74289). W. D. Stuckenberg. Ills. 1000 w. Power—Oct. 31, 1916. Proper and improper methods.

Fuel Sampling (76921). 2000 w. Times Eng Supp—Jan. 26, 1917. Various methods commonly employed for collecting and treating coal for test.

**Saskatchewan**

Wood Mountain-Willowbunch Coal Area, Saskatchewan (77469 N). Bruce Rose. Ills and Maps. 86 pp. Can. Dept. Mines, Mem 89—No. 1138. Results and investigation.

**Scotland**

The Form and Structure of the Coalfields of Scotland (77454 N). David Ferguson. Ills. & Plate. 36 pp. Instn Min Engrs, Trans—Feb., 1917. Structural features and basin areas.

**Screens**

The Pendulum Hanger for Shaker Screens (77056). John A. Garcia. Ills. 1200 w. Cl Age—March 3, 1917. Explains important features and gives results.

**Screen Scale**

Screen Scale for Coal-Testing Work (81010). E. A. Holbrook. Ills. 2000 w. Cl Age—Sept. 8, 1917. Argument for uniformity in the selection of screens.

**Shafts**

Smallest Mine Shaft in the World (76334). Ills. 600 w. Cl Age—Jan. 27, 1917. Small shaft sunk at Scranton armory to enable workmen to reach abandoned mines and reinforce the pillars.

The Cementation of Llay Hall Shafts (77414 A). P. Sidebottom. Ills. 3000 w. Colly Gdn—March 2, 1917. Water trouble problems, benefits from cementation, etc.

**Shot-firing**

Shot-firing in Bituminous Mines (76195 D). M. D. Cooper. Ills. 3000 w. A I M E, Bul—Jan., 1917. Materials used, method, misfires, etc.

**Solvents**

The Action of Solvents on Coal (75660 A). From *Jl. Soc. of Chem. Ind.* 1200 w. Ir & Cl Trds Rev—Dec. 15, 1916. Summary of research work.

**Spontaneous Combustion**

Spontaneous Combustion in Coal Mines (78915). Rowland Gascoyne. 2500 w. Cl Age—May 26, 1917. Causes responsible for such fires underground, how to minimize the risk, methods of fighting.

**Spontaneous Ignition**

The Spontaneous Firing of Coal (79940 A). J. S. Haldane, with editorial. Read before Instn. of Min. Engrs. 7800 w. Colly Gdn—June 22, 1917. Reviews work in the Doncaster Coal Owners' Research Laboratory during the last four years.

Spontaneous Firing of Coal (80046). 2000 w. Times Eng Supp—June 29, 1917. Paper by Dr. J. S. Haldane before Instn. of Min. Engrs. Results of recent investigations on the subject.

The Spontaneous Firing of Coal (81144 N). J. S. Haldane, with discussion. 82 pp. Instn Min Engrs, Trans—Aug., 1917. Reviews general results thus far reached in determining conditions under which spontaneous fires in coal occur.

**Stokers**

Mechanical Stokers at Collieries (80389 A). Ills. 5000 w. Colly Gdn—July 20, 1917. Development of the underfeed stoker; their use in coal mines in the United States.

**Stone-Dusting**

Stone-Dusting in Collieries—Some Observations on the Properties and Characteristics of Various Stone Dusts (80576 A). L. G. Hill. 1800 w. Ir & Cl Trds Rev—Aug. 3, 1917. Gives results of experiments and investigations.

**Storage**

Economical Bituminous Coal Storage (76873). Horace Goldstein. Ills. 1500 w. Cl Age—Feb. 24, 1917. Methods in common use and their cost.

Storage of Coal and Fuel Economy (76925). 2000 w. Times Eng Supp—Jan. 26, 1917. Advantages and economy, under present conditions of storing large supplies of coal.

**Stripping**

Coal Stripping With an Electric Shovel (76766). Wilbur G. Burroughs. Ills. 1200 w. Cl Age—Feb. 17, 1917. Work at Pittsburgh.

**Subsidence**

Surface Subsidence in Illinois Resulting from Coal Mining (75999 N). Lewis E. Young. Maps and Ills. 100 pp. Ill State Geol Surv—Bul. 17. Preliminary survey and investigations.

**Sulphur**

The Effect of Sulphur on the Value of Coal (78019). Albert Martineau. 1000 w. Elec Wld—April 14, 1917. How different forms of sulphur affect the heating value of coal.

**Surface Plant**

Blue Diamond Coal Co.'s Plant at Cardiff, Ky. (77895). H. Reisser. Ills. 1500 w. Cl Age—April 7, 1917. Details of a surface plant for coal production and preparation.

**Tennessee**

Coals in the Area Between Bon Air and Clifty, Tennessee (76324 N). Charles Butts. Map. 800 w. U S Geol Surv, Bul 641-K—Jan. 19, 1917.

**Thin Coal**

Suggestions on Thin-Coal Mining (80364). J. F. K. Brown. 5500 w. Cl Age—Aug. 4, 1917. Helps to successful mining.

**Thin Seams**

Intensive Mining in Thin Seams (80978 A). George Gibb. 1500 w. Colly Gdn—Aug. 17, 1917. From a paper before Min. Inst. of Scotland. Details.

The Mining of Thin-Coal Seams as Applied to the Eastern Coal-Fields of Canada (81364 N). J. F. Kellock Brown. Ills. & Maps. 132 pp. Can Dept Mines—Bul. No. 15. Outlines problems involved.

A Fresh Aspect of Intensive Mining Thin Seams (81879 N). George Gibb. Plate. 900 w. Instn Min Engrs, Trans—Oct., 1917. Outlines methods used in the successful development of thin coal seams.

**Timber**

Wood-Preserving Opportunities in the Anthracite Field (81333). Kurt C. Barth. Ills. 2000 w. Cl Age—Sept. 22, 1917. Importance of wood preservation and the advantages of creosoting.

**Timbering**

The Symmes Method of Timbering (76486). Wesley S. Harris. Ills. 800 w. Cl Age—Feb. 3, 1917. Adapted to thin coal beds.

Some Causes of Decay of Timbers in Coal Mines (76893 N). J. Mitchell, with discussion. 7000 w. Instn Min Engrs, Trans—Jan., 1917. Information concerning fungi and combative and preventive measures.

**Tipples**

A Concrete Tipple in Ohio (74837). William G. Burroughs. Ills. 800 w. Cl

Age—Nov. 25, 1916. Construction adopted.

An Automatic Tipple Near Houtzdale, Penn. (75475). H. V. Schiefer. Ills. 1500 w. Cl Age—Dec. 23, 1916. Equipment and operation.

Allegheny River Mining Co.'s Cadogan Tipple (76485). H. Reisser. Ills. 1600 w. Cl Age—Feb. 3, 1917. A double unit. Features of interest.

Reconstruction of the Benham Tipple (78004). H. B. Cooley. Ills. 1200 w. Cl Age—April 14, 1917. Designed for the preparation of both domestic and coking coal.

Tipple in Powhatan in Pocahontas Field (78917). Henry J. Edsall. Ills. 2500 w. Cl Age—May 26, 1917. Installation designed to produce all market sizes.

Rebuilding a Tipple (80196). Miner Raymond. Ills. 1600 w. Cl Age—July 28, 1917. New steel tipple built in center line of old wooden one and placed in operation with one shutdown of 45 min.

**Transvaal**

Coal Mining in the Transvaal (78607). C. C. Smith. 1200 w. Cl Age—May 12, 1917. Conditions and working methods.

**Tubs**

Dust-Tight Tubs. (76708 A). 4000 w. Ir & Cl Trds Rev—Jan. 26, 1917. Discussion introduced by J. W. McTrusty.

**Washery**

New Coal Washery, Coke Ovens and By-Product Plant at Risca Colliery (75403 A). Ills. & Plate. 1200 w. Ir & Cl Trds Rev—Dec. 1, 1916. Plant and equipment.

A Kentucky Washery (77376). Newell G. Alford. Ills. 2500 w. Cl Age—March 17, 1917. Details of plant at Earlington, Ky.

**Washing Plant**

Flat Top Coal-Washing Plant (74696). J. G. Hanlin. Ills. 1500 w. Cl Age—Nov. 18, 1916. Washing reduces the ash content about 8 per cent.

**Weathering**

The Weathering of Coal (75143). J. B. Porter. 5000 w. Can Min Jl—Dec. 1, 1916. Discusses the weathering at mines, in transit, and in storage; causes, etc.

**Waste**

Coal Wastage (78720 D). Francis S. Peabody. 3500 w. A I M E, Bul—May, 1917. Causes of waste; faults of methods used; need of regulation.

**Water Gas**

Le Gas A L'Eau Dans L'Éclairage Au Gas De Houille (82028 B). M. Bousquet. Ills. 3600 w. La Nat—Sept. 15, 1917. Comparison of water gas and coal gas for lighting.

**Wyoming**

Coal Mining in Northern Wyoming (74694). M. F. Peltier. Ills. 2500 w. Cl Age—Nov. 18, 1916. Coal of Sheridan field; methods.

## GEOLOGY

**Alberta**

The Southern Plains of Alberta (79096 N). D. B. Dowling. Ills. 189 pp Can Dept Mines—Mem 93. Aims to bring early observations into accord with recent work. A geological study.

**Analysis**

The Interpretation of Water Analysis by the Geologist (77283 B). G. Sherburne Rogers. 33 pp. Econ Geol—Jan., 1917. Method suggested by Chase Palmer.

**Arizona**

The Geologic Distribution and Genesis of the Metals in the Santa Rita—Patagonia Mountains, Arizona (78765 B). Frank C. Schrader. 32 pp. Econ Geol—April-May, 1917.

**Asbestos**

Origin of Massive Serpentine and Chrysotile-Asbestos. Black Lake—Thetford Area, Quebec (78074 B). R. P. D. Graham. 48 pp. Econ Geol—Feb.-March, 1917. General geology, mode of occurrence, mode of origin, composition, etc.

The Geology of the Country to the South of Kalgoorlie (Coolgardie and East Coolgardie Goldfields), Including the Mining Centers of Golden Ridge and Feysville (76772 N). C. Sidney Honman. 9 Plates & Ills. 60 pp. W. Aust. Geol, Sur—Bul No. 66.

Analyses of Western Australian Rocks, Meteorites, and Natural Waters (78776 N). Edward S. Simpson. Ills. 190 pp. W. Aust Geol Surv—Bul. No. 67.

**Black Hills**

A Bibliography of the Geology and and Mining Interests of the Black Hills Region (79842 N). Cleophas C. O'Harra. Map. 215 pp. S Dak Sch Mines, Bul 11—May, 1917.

**British Columbia**

Geology of Graham Island, British Columbia (77961 S). J. D. MacKenzie. Maps & Ills. 209 pp. Can Dept Mines—Mem. 88. Results of exploration to determine the extent, structure, and value of coal deposits.

Geology of the Nanaimo Map-Area (74766 N). Charles H. Clapp. Ills. &

Maps. 127 pp. Can Dpt Ms—Mem. 51. Information of rock formations, coal seams and their probable extent.

Geology of a Portion of the Flathead Coal Area, British Columbia (79814 N). J. D. MacKenzie. Map & Ills. 49 pp. Can Dept Mines—Mem 87. General description of the district and its geology.

**California**

The Geologic Formations of California, with Reconnaissance Geologic Map (78097 N). James Perrin Smith. 35 pp. Calif Min Bureau, Bul. 72—Nov., 1916. Data and general geological information.

**Canada**

Pleistocene and Recent Deposits in the Vicinity of Ottawa, with a Description of the Soils (81885 N). W. A. Johnston. Map & Ills. 50 pp. Can Dept Mines—Mem. 101. Results of an investigation of the superficial deposits.

**Canyons**

The Physiographic Conditions at Butte, Montana, and Bingham Canyon, Utah, When the Copper Ores in These Districts Were Enriched (76050 B). Wallace W. Atwood. Ills. 42 pp. Econ Geol—Dec., 1916. Study of these regions and results.

**Coal**

Micro-Petrology of Coal (79052 A). G. Hickling. From paper read before the Manchester Geol. & Min. Soc. 6500 w. Colly Gdn—May 18, 1917. Results of study.

**Coal Age**

Forests of the Coal Age (80760 A). D. H. Scott, with discussion. 5000 w. Colly Gdn—Aug. 10, 1917. From paper before Midland Inst. of Min., Civ., & Mech. Engrs. Plants described and characteristics of coal forests.

**Coal Fields**

Geological Research in the Coal Fields During 1915 (74738 A). 2800 w. Colly Gdn—Nov. 3, 1916. Field work in Great Britain.

The Structure of the South Staffordshire Coalfield, With Special Reference to the Concealed Areas and to the Neighboring Fields (75305 N). E. A. Newell Arber, with bibliography and discussion. 35 pp. Instn Min Engrs, Trans—Nov., 1916. Geological study.

Some Effects of the Master Folds Upon the Structure of the Bristol and Somerset Coalfields (76890 N). Ernest H. Staples, with discussion. Plate. 12 pp. Instn Min Engrs, Trans—Jan., 1917. Geological study.

**Colorado**

Note on the Age of the Scranton Coal, Denver Basin, Colorado (77361 B). G. B. Richardson. 500 w. Am Jl Sci—March, 1917. Evidence that the coal is of post-Laramie age.

Foothills Structure in Northern Colorado (80125 N). Victor Ziegler. Ills. 37 pp. Colo Sch Mines, Jl—April, 1917. Stratigraphy, structural features, etc.

**Cornwall**

The Geology of the East Pool Mine at Camborne, Cornwall (79117 A). Malcolm Maclaren. Also Development of Rogers Lode. Ills. 4000 w. Min Mag—May, 1917

**Cuba**

Geology of the Iron-Ore Deposits of the Firmeza District, Oriente Province, Cuba (78123 D). 4500 w. A I M E, Bul—April, 1917. Discussion of Max Roesler's paper.

**Deposits**

The Diastrophic Theory (75259 D). 3200 w. A I M E, Bul—Dec., 1916. Discussion of Marcel R. Daly's paper.

**Faults**

The Effects of Cross Faults on the Richness of Ore (81589 D). Edgar K. Soper. Ills. 13 pp. A I M E, Bul—Oct., 1917. Studies of ore deposition.

**Formkohle**

Origin of Formkohle (77360 B). John J. Stevenson. 12 pp. Am Jl Sci—March, 1917. A peculiar type of brown coal found in several localities. Examines hypotheses advanced.

**Geologists**

Railway Geological Department (74847). Joel H. Watkins. 3000 w. Eng & Min Jl—Nov. 25, 1916. The function of the economic geologists.

**Hematite**

Zonal Growth in Hematite, and Its Bearing on the Origin of Certain Iron Ores (79150 D). R. B. Sosman and J. C. Hostetter. Ills. 10 pp. A I M E, Bul—June, 1917. Nature and cause of inhomogeneity in certain special cases.

**India**

Records of the Geological Survey of India (79557 N). Ills. & Maps. 74 pp. Geol Surv of India—Dec., 1916.

**Mercury**

Some Experiments Bearing on the Secondary Enrichment of Mercury Deposits (74340 B). T. M. Broderick. 2200 w. Econ Geol—Oct.-Nov., 1916. Experiments to show the chemistry involved.

**Missouri Ores**

Laws of Distribution of Lead in Southeast Missouri Ores (79269). Sergio Bagnara. 1500 w. Eng & Min Jl—June 16, 1917. Relative fineness of galena in gangue, and point where grinding would cease to be profitable.

**Montana**

Anticlines in the Blackfeet Indian Reservation, Montana (76280 N). Eugene Stebinger. Maps. 25 pp. U S Geol Surv, Bul. 641-J—Jan. 22, 1917. Account of geological formations that appear to contain oil or gas.

**Montreal Island**

The Pleistocene and Recent Deposits of the Island of Montreal (74767 N). J. Stansfield. Maps & Ills. 70 pp. Can Dpt Ms—Mem. 73. Geology, topography, deposits, glaciation, economic geology.

**Nevada**

Geology and Water Resources of Big Smoky, Clayton, and Alkali Spring Valleys, Nevada (79145 N). Oscar E. Meinzer. Ill & Maps. 153 pp. U S Geol Surv —Water Sup. paper 423.

**Nickel Ores**

The Origin of the Sudbury Nickel Ores (76490). C. F. Tolman, Jr., and Austin F. Rogers. Ills. 2000 w. Eng & Min Jl —Feb. 3, 1917. Examination with polarizing and reflecting microscopes to determine genesis.

**Oklahoma**

Geologic Structure in the Cushing Oil and Gas Field, Oklahoma (80286 D). Carl H. Beal. 11 pp. A I M E, Bul— Aug., 1917. Study and analysis of information collected.

**Ontario**

Late Pleistocene Oscillations of Sea-Level in the Ottawa Valley (74975 N). W. A. Johnston. Map. 13 pp. Can Dpt Ms, Museum Bul, No. 24—Sept 15, 1916. Summary of results of field work.

The Relation of the Titaniferous Magnetite Ores of Glamorgan Township, Haliburton County, Ontario, to the Associated Scapolitic Gabbros (74342 B). W. G. Foye. Ills. 3500 w. Econ Geol—Oct.-Nov., 1916. Geological study.

The Trent Valley Outlet of Lake Algonquin and the Deformation of the Algonquin Water-Plane in Lake Simcoe District, Ontario (74974 N). W. A. Johnston. Map & Ills. 27 pp. Can Dpt Ms, Museum Bul, No. 23—Aug., 1916. Description and information.

**Orebodies**

The Geology of the Bowdwin Mines, Burma, Asia (75251 D). M. H. Loveman. Map & Ills. 7000 w. A I M E, Bul—Dec., 1916. Topography.

**Ore Deposits**

The Relation of Ore Deposition to Faulting (74338 B). J. E. Spurr. 22 pp. Econ Geol—Oct.-Nov., 1916. Deductions from various examples of mining districts.

Exploration of Metalliferous Deposits (77437 D). W. H. Emmons. 4500 k. A I M E, Bul—March, 1917. Aids in prospecting and developing mines.

Ore Deposition and Enrichment at Engels, California (77280 B). L. C. Graton and D. H. McLaughlin. Ills. 38 pp. Econ Geol—Jan., 1917. Investigations and conclusions of these copper deposits. Study of secondary enrichment.

Magnetic Segregation and Ore Genesis (78925). Joseph T. Singewald, Jr. 4000 w. Min & Sci Pr—May 26, 1917. A study of ore deposits.

**Ore Minerals**

The Constitution of Pyrite and Allied Minerals (79118 A). W. H. Goodchild. 4000 w. Min Mag—May, 1917. Study of a few of the commonest ore minerals.

**Ores**

Notes on the Geology and Iron Ores of the Cuyuna District, Minnesota (79333 N). E. C. Harder and A. W. Johnston. Map. 25 pp. U S Geol Surv, Bul 660-A —June 7, 1917. Preliminary report.

The Ores of Copper, Lead, Gold and Silver (80108). Charles H. Fulton. 35 pp. U S Bur Mines—Tech paper 143. Information of value on ore types.

**Petroleum**

Ethics of the Petroleum Geologist (78072 B). Frederick G. Clapp, with reference list of papers on engineering ethics. 32 pp. Econ Geol—Feb.-March, 1917. Outline of ethical code, with discussion of questions.

**Replacements**

The Replacement of Sulphides by Quartz (79153 D). H. N. Wolcott. Ills. 600 w. A I M E, Bul—June, 1917. Describes specimens studied.

**Rhodesia**

The Geology of the Shamva Mine (76046 A). George S. Costorphine. Ills. 3500 w. Min Mag—Dec., 1916. Geological report of this gold mine.

**Ripple-Mark**

Recent and Fossil Ripple-Mark (79095 N). E. M. Kindle. Ills. 121 pp. Can Dept Mines, Bul 25—March 26, 1917. Aims to present criteria by which the many varieties of ripple-mark may be referred to a few general types. Practical applications.

**Russia**

Geology and Ore Deposits of the Tetiuxe District, Russia (78766 B). G. S. Nishihara. Ills. 9 pp. Econ Geol—April-May, 1917. Location, geology, ore deposits, etc.

**Scotland**

The Hurlet Sequence and the Base of the Carboniferous Limestone Series in the Districts of Campsie and Kilsyth (75304 N). David Ferguson. 3 plates. 25 pp.

Instn Min Engrs, Trans—Nov., 1916. Characteristic features; geological study.

Discussion of Mr. David Ferguson's Paper on "The Form and Structure of the Coalfields of Scotland (80490 N). 14 pp. Instn Min Engrs, Trans—July, 1917. Interesting comments.

**South Africa**

The Economic Geology of the Insizwa Range (76033 N). W. H. Goodchild. 7 plates. 44 pp. Instn Min & Met, Bul 147—Dec. 14, 1916. Shows that ore de posits are likely to be completely hidden unless uncovered by denudation or outcropping.

**Tennessee**

General Oil and Gas Conditions of the Highland Rim Area in Tennessee (81944 N). A. H. Purdue. 8 pp. Resources Tenn—Oct., 1917. Geology and possibilities.

Structure of the Waynesboro Quadrangle with Special Reference to Oil and Gas (81943 N). Hugh D. Miser. Ills. 20 pp. Resources Tenn—Oct., 1917. Reports a study of the geology and the possibility of finding oil and gas.

**Tungsten**

Tungsten Minerals and Deposits (79144 A). Frank L. Hess. Ills. 73 pp. U S Geol Surv—Bul 652. Facts about tungsten, the minerals in which it is found, kinds of deposits, and other valuable information.

**Wales**

The Metalliferous Formation of Flintshire and the Origin and Drying of Holywell Well (78219 A). William Hopwood. Read before Nat. Assn. of Col. Mgrs. (N. Wales Br.). Plan. 3500 w. Ir & Cl Trds Rev—April 6, 1917. The geological history of the formations.

**Warren District**

Geology of the Warren Mining District (75254 D). 1800 w. A I M E, Bul—Dec., 1916. Discussion of paper of Y. S. Bouillas, J. B. Tenney, and Leon Fenchére.

**Wood Tin**

Wood Tin in the Tertiary Rhyolites of Northern Nevada (74341 B). Adolph Knopf. Ills. 2000 w. Econ Geol—Oct.-Nov., 1916. The origin of the deposits and features of deposition.

## IRON AND STEEL

**Alloy Steels**

Alloy or Carbon Steels Versus Carbonized (78448 A). E. F. Lake. 3000 w. Iron Age—May 3, 1917. Serial, 1st part. An argument for the former.

Topical Discussion on the Rôle of the Several Alloying Elements in the Alloy Steels (79506 N). Ills. 40 pp. Am Soc Test Mat—June, 1917. Different authors discuss the rôle of manganese, of nickel, silicon, vanadium, and chrome-vanadium in modern steels.

The Determination of Tantalum in Alloy Steel (80948 B). G. L. Kelley, F. B. Myers, and C. B. Illingworth. 1200 w. Jl Ind & Eng Chem—Sept., 1917. Outlines methods which may be used in steels containing nickel, cobalt, aluminum, chromium, vanadium, and tungsten.

**American Steel**

World-Wide Demand for American Steel (75715 D). 3000 w. Ir Age—Jan. 4, 1917. Special No. General review.

**Australia**

The Iron and Steel Industry of Australia (79804). R. A. Field. Ills. 1800 w. Bt Fc & St Pt—July, 1917. Location of iron ore deposits. Steel works at New Castle, N. S. W.

**Bar Mill**

New Design Bar Mill at Youngstown (77817 A). Ills. 700 w. Iron Age—April 5, 1917. Unusual features.

**Beams**

Rolling Wide-Flanged Beam Sections (79114). F. Denk. 1500 w. Bt Fc & Stl Pt—June, 1917. Serial, 1st part. Theory and practice in production of Gray, Sack and Puppy sections.

**Bearings**

Enter Roller Bearings for Steel Mill Cars (79112). J. B. Liebermann. Ills. 25 w. Bt Fc & Stl Pt—June, 1917. Interesting tests on train resistance, made by a dynamometer testing device.

**Blast Furnaces**

The Future of the Iron Blast Furnace (75782 A). J. E. Johnson, Jr. 4000 w. Met & Chem Eng—Jan. 1, 1917. Concluding article of a series showing along what lines developments may occur.

Allowing Blast-Furnace Shaft to Expand (77674 A). Ills. 2200 w. Iron Age—March 29, 1917. Some unusual features of the rebuilt plant of Pulaski Iron Co.

Air Drying for Blast Furnaces (78289 B). Leon Cammen. Ills. 1700 w. Engrs' Soc West Penn, Pro—April, 1917. State of the art; present process and principles on which it is based.

Power Equipment for Blast Furnaces (77791). Charles L. Hubbard. Ills. 1800 w. Natl Engr—April, 1917. Deals with matters differing from the ordinary power plant.

Calculations with Reference to the Use of Carbon in Modern American Blast Furnaces (78726 D). 19 pp. A I M E, Bul—May, 1917. Discussion of the paper by H. P. Howland.

**Blooming Mills**

Electrical Reversing Blooming Mills (81269 N). Ralph D. Nye. 2500 w. Assn I S E E—Sept., 1917. Results from two typical installations.

**Blowing Engines**

Air Delivery Factors of Blowing Engines (75679). W. Trinks. Ills. 1500 w. Blt Fc & Stl Pt—Dec., 1916. Characteristics of engine may cause remissness of air supply.

**Blowing Plant**

New Blowing Plant at Millom Works (76148 A). Ills. 2000 w. Ir & Cl Trds Rev—Jan. 5, 1917. Details of the plant.

**Briquetting**

Notes on the Present Knowledge and Practice in Regard to the Briquetting of Iron Ores (81595 N). Guy Barrett and T. B. Rogerson. Ills. 42 pp. Ir & St Inst—Sept., 1917. Résumé of available information.

Briquetting of Iron Ores (82043). 1200 w. Times Eng Supp—Sept. 28, 1917. Report to the Iron and Steel Institute on methods of briquetting now in use.

**Canada**

The Production of Iron and Steel in Canada During the Calendar Year 1915 (75152 N). John McLeish. 48 pp. Can Dpt Ms—No. 419. Statistics.

The Iron and Steel Resources and Industries of Canada (76161 N). Thomas Cantley. 15 pp. Can Min Inst, Bul—Jan., 1917. The location of deposits, general conditions, etc.

The Production of Iron and Steel in Canada During the Calendar Year 1915 (70619 N). John McLeish. 48 pp. Can Dept Mines—No. 419. Advance chapter of annual report.

**Carbon Content**

Sur Le Dosage Du Carbone Par La Méthode Eggertz (76253 C + D). Chatelier and Bogitch. 3200 w. Rev Metal—July-Aug., 1916. Discussion of the Eggertz method for determination of the carbon content of steel.

**Carbon Monoxide**

Carbon Monoxide Dangers at Iron Works (79310 A). 1600 w. Iron Age—June 21, 1917. Method by which hazard is reduced. Results of an investigation by the Bureau of Mines.

**Carburizing**

Failure of the Carburizing Process (78956 A). Abstract of a paper by E. F. Lake read before the Steel-treating Research Club of Detroit. 1800 w. Machy—June, 1917. New processes and methods for making steels of improved quality.

**Cementation**

Cementation by Gas Under Pressure (78801 N). F. C. Langenberg. Ills. 25 pp. Ir & St Inst—May, 1917. Describes the pressure service developed in Harvard University Metallurgical Laboratory.

**Chile**

La Industria Siderurgica En Chile (81394 D). D. Tobar. 3300 w. Bol Min —July, 1917. Development of the iron and Steel Industry in Chile.

**Chromium**

Chromium and Chromiferous Iron Ores (76382 A). 2200 w. Engng—Jan. 12, 1917. The uses of chromic iron ores, and the production of chromium.

**Concentration**

The Magnetic Concentration of Low-grade Iron Ores (76589 D). S. Morton and S. Le Fevre. Ills. 4000 w. A I M E, Bul—Feb., 1917. Resources; development of magnetic separator; methods, etc.

The Wetherbee Iron-Ore Concentrator at La Rue Mine (76763). Stanley A. Mahon. Ills. 1500 w. Eng & Min Jl—Feb. 17, 1917. Concentrator for hard iron ore using upward current of water.

**Converter**

Innovazioni Nelle Acciaierie Thomas (81382 B). 1900 w. Ind—Aug. 21, 1917. Description of the Thomas converter.

**Cowper Stoves**

Heat Balance of a Blast Furnace Stove (74622 A). R. S. G. Knight. From a paper granted Carnegie Scholarship memoir by the Iron & Steel Inst. 2500 w. Iron Age—Nov. 16, 1916. Results of operation of Cowper stoves.

**Deoxidizers**

An Investigation of Deoxidizers for Steel (77118 A). H. M. Boylston. From a paper awarded a Carnegie scholarship memoir. Ills. 2000 w. Iron Age—March 8, 1917. Relative merits of various agents used in steel making.

**Duplex Process**

Steel Production by the Duplex Process (80916). J. K. Furst. Ills. 2000 w. Bt Fc & Stl Pt—Sept., 1917. Serial, 1st part. Construction and arrangement of plant; methods of operation, equipment, etc.

Duplex Process of Lackawanna Steel Company (74333 A). George B. Waterhouse. Ills. 4500 w. Iron Age—Nov. 2, 1916. Details of plant and process with results. Also discussion.

**Electric Furnaces**

Electric Steel Furnaces, With Special Refernce to the Greaves-Etchells Type (80120 A). E. Kilburn Scott. Ills. 3000 w. Ir & Cl Trds Rev—July 6, 1917. Factors favoring electric furnaces; types, etc.

**Electric Steel**

The Status of the Electric Steel Industry (75731 D). 2500 w. Iron Age—Jan. 4, 1917. Special No. United States leads all countries in furnaces and output.

See same heading under ELECTRICAL ENGINEERING, *Power Applications.*

**Embargo**

New Steel Embargo Aimed at Plates (80414 A). 2000 w. Iron Age—Aug. 9, 1917. New rules governing iron and steel shipments. Designed to bring Japanese vessels into the Atlantic trade for war purposes.

**Etching**

The Determination of the Line SE in the Iron-Carbon Diagram by Etching Sections at High Temperatures in Vacuo (78804 N). N. Tachischewsky and N. Schulgin. Ills. 10 pp. Ir & St Inst—May, 1917. Experiments to determine the cementite line.

**Ferrite Grains**

The Supposed Reversal of Inheritance of Ferrite Grain Size from that of Austenite (81221 D). Henry M. Howe. 700 w. A I M E, Bul—Sept., 1917. Data on case of grain growth which cast doubt on Prof. Jeffries' hypothesis.

**Ferromanganese**

Germany's Supplies of Ferromanganese (75669 A). Edwin F. Cone. 3300 w. Iron Age—Dec. 28, 1916. The situation before and since the war.

Manganese in West-Central Arkansas (75677). Garnett A. Joslin. 1200 w. Min & Sci Pr—Dec. 30, 1916. The deposits and mining conditions.

Ferromanganese in the Iron and Steel Industry (78785 B). Robert J. Anderson. 4000 w. Fkn Inst, Jl—May, 1917. Explains the gravity of the situation.

Metallurgy of Ferromanganese (79047). Robert J. Anderson. 3000 w. Eng & Min Jl—June 2, 1917. Used in producing sound steel.

**Ferrosilicon**

The Metallurgy of Ferrosilicon (79461). Robert J. Anderson. Excerpts from an article in *Iron Trade Rev.* Ills. 3000 w. Eng & Min Jl—June 23, 1917. Its uses, characteristics and methods of manufacture.

**France**

L'Industrie De L'Acier En France (76254 B). Ills. 3200 w. La Nat—Jan. 6, 1917. History of development of French steel industry, principal plants, production, etc.

**Fuels**

Pulverized Coal as Fuel for Open-Hearth Furnaces (74834 A). James Wheeler Fuller, with discussion. Ills. 2000 w. Iron Age—Nov. 2, 1916. Its advantages.

**Furnaces**

Arc Furnaces for Steel-Making (76707 A). Ills. 4500 w. Ir & Cl Trds Rev—Jan. 26, 1917. Electric furnaces used for steel-making, particularly the arc furnace and its advantages.

See also ELECTRIC FURNACES, under ELECTRICAL ENGINEERING, *Power Applications.*

**Gas Cleaning**

Dry-Hot versus Cold-Wet Blast-Furnace Gas Cleaning (76594 D). Linn Bradley, H. D. Egbert, and W. W. Strong, with bibliography. 6000 w. A I M E, Bul—Feb., 1917. Problems from the standpoint of economy of using a gas of higher flame temperatures, of improved design, and of economy in gas-cleaning.

Dry Hot versus Cold-Wet Blast-Furnace Gas Cleaning and Some Suggestions Regarding Construction of Hot-Blast Stoves (78136 D). 13 pp. A I M E, Bul—April, 1917. Discussion of papers of Linn Bradley, H. D. Egbert, and W. W. Strong.

**Gas Engines**

Gas Engines v. Steam Turbines for Iron and Steel Works (79022 A). Douglas L. Cooper. Read before Cleveland Inst. of Engrs. 3500 w. Mech Engr—May 11, 1917. Favors gas engines for general use.

**Germany**

The German Iron and Steel Industry During the War (75457 A). 1200 w. Engng—Dec. 8, 1916. Summary.

The Future of the German Iron and Steel Industry (79978 A). 1800 w. Engng—June 29, 1917. Editorial on the altered conditions and arrangements to meet them.

Germany's Hold on the Iron Ore of France (79584 A). 3000 w. Engng—June 8, 1917. Serial, 1st part. Extracts from a German report showing attempts to gain possession of French ore deposits.

German Iron and Steel (80037). 1000 w. Times Eng Supp—June 29, 1917. Preparations in the steel trade for conditions after the war, and their effect in England.

**Heat Treatment**

Heat Treatment for Special Alloy Steels (74689). Robert R. Abbott. Ills. 2500 w. Stl & Iron—Nov., 1916. Methods for obtaining desired qualities.

Heat Treatment of Steel (75086 A). Martin Syte. Ills. 5000 w. Machy—Dec., 1916. Serial, 1st part. Elementary treatise on steel and changes wrought by heat treatment.

Effect of Time in Reheating Hardened Steel below the Critical Range (76599 D). Carle R. Hayward, S. B. and S. S. Raymond. 2200 w. A I M E Bul—Feb., 1917. Investigation and results.

The Heat Treatment of Steel (79304 A). Millard F. Cox. 1200 w. Mech Wld —May 25, 1917. The improvement in quality, the difficulties, etc.

**Hot-Blast Stoves**

Some Suggestions Regarding Construction of Hot-Blast Stoves (76595 D). Linn Bradley, H. D. Egbert, and W. W. Strong. 1500 w. A I M E, Bul—Feb., 1917. Improvements in design.

**Ingots**

On the Formation of Columnar and of Free Crystals During Solidification (75069 A). Henry M. Howe. Ills. 1500 w. Met & Chem Eng—Dec. 1, 1916. Conditions which lead to different results.

Steel Ingot Defects (78800 N). J. N. Kilby. Ills. 21 pp. Ir & St Inst—May, 1917. Main defects; their causes; methods of manufacture, etc.

Results of Rolling from Green Ingots (80995 A). George W. Dress. Ills. 1100 w. Iron Age—Sept. 6, 1917. Premature charging into hot reheating furnace and the large internal steel structure produced.

**Iron**

La Métallurgie Du Fer (75594 C + D). L. Guillet. Ills. 57 pp. Soc Enc Ind Nat —Sept.-Oct., 1916. Comparative study of metallurgy in France and other countries.

**Iron Analysis**

Characteristic Edges of Pig Iron Samples (75833). Wallace G. Imhoff. Ills. 1200 w. Bt Fc & Stl Pt—Jan., 1917. Furnacemen's method of judging the iron analysis at casting.

**Iron and Steel**

Iron and Steel (75764). 2500 w. Eng & Min Jl—Jan. 6, 1917. Production, markets, etc.

Mineral Requirements of Our Iron and Steel Industries (75894 A). W. G. Fearnsides. Abstract of paper read before the Soc. of Engrs. 2000 w. Colly Gdn—Dec. 22, 1916. Geographical distribution of British supplies; overseas supplies, etc.

**Iron Ore**

Iron Ore Production of United States in 1916 and 1917 (80797). 2500 w. Mfrs' Rec—Aug. 23, 1917. Reports an increase of nearly 20,000,000 tons.

Manganiferous Iron Ores of the Cuyuna District, Minnesota (81219 D). E. C. Harder. Map. 30 pp. A I M E, Bul—Sept., 1917. Situation and geology of this district; iron- and manganese-bearing rocks and ores; origin, etc.

The Shortage of the Supply of Non-Phosphoric Iron Ore (81877 A). William George Fearnsides. Howard lecture. Map. 7000 w. Roy Soc Arts, Jl—Sept. 28, 1917. Serial, 1st part. British home supplies and reserves.

**Iron Trade**

Features of the Iron Trade in 1916 (75716 D). 6 pp. Iron Age—Jan. 4, 1917. Special No. Reports from Chicago, Pittsburgh, Eastern Pennsylvania, Cincinnati, etc.

The Iron and Steel Trade in 1916 (75986 A). 17000 w. Ir & Cl Trds Rev —Dec. 29, 1916. District reviews.

**Labor**

Machinery and Steel Plant Labor (78589 A). Charles Reitell. 3000 w. Iron Age—May 10, 1917. Changes due to the introduction of machinery; falling off of unskilled labor.

**Laboratory**

Laboratoire D'Essais Pour Fonderie (76238 B). Ills. 2300 w. Gen Civ—Dec. 23, 1916. A metallurgical research laboratory at a German steel mill.

**Limonite**

Damascus Steel from Mount Lebanon Iron Ore (75442). J. F. Kellock Brown. Ills. 1200 w. Eng & Min Jl—Dec. 23, 1916. High grade limonite is found. Indications of ancient workings.

**Lorraine**

Le Gisement De Minerai De Fer Lorrain (78298 B). J. Tribot-Laspière. Ills. 10,000 w. Gen Civ—April 7, 1917. Mineral and metallurgical study, particularly of iron, in the Province of Lorraine.

**Low-Carbon Steel**

Grain-Growth in Deformed and Annealed Low-Carbon Steel (80524 N). Ralph H. Sherry. Ills. 20 pp. Faraday Soc, Trans—June, 1917. History, experimental study and conclusions, with discussion and bibliography.

**Magnetic Analysis**

Some Applications of Magnetic Analysis to the Study of Steel Products (79495 N). Charles W. Burrows. Ills. 17 pp. Am Soc Test Mat—June, 1917. Meaning and possibilities of magnetic analysis.

**Malleable Iron**

Increased Utility of Modern Malleable Iron (80683). A. H. Weston. Ills. 2500 w. Ry Age Gaz—Aug. 24, 1917. Facts and fallacies regarding the manufacture and physical characteristics. Its field of usefulness.

**Manganese**

The Significance of Manganese in American Steel Metallurgy (76593 D). F. H. Willcox. 3500 w. A I M E, Bul—Feb., 1917. Materials used as deoxidizers; present situation in America, and suggestions.

The Significance of Manganese in American Steel Metallurgy (78131 D). 3500 w. A I M E, Bul—April, 1917. Discussion of F. H. Willcox's paper.

**Marklesburg, Pa.**

The Iron Ores of the Marklesburg Region (75680). Wallace G. Imhoff. Ills. 1200 w. Blt Fc & Stl Pt—Dec., 1916. Mineralogy and use.

**Mild Steel**

The Embrittling Action of Sodium Hydroxide on Mild Steel and Its Possible Relation to Seam Failures of Boiler Plate (78425 A). Paul D. Merica. Ills. 5500 w. Met & Chem Eng—May 1, 1917. Experimental study. Brittleness is explained and remedies recommended.

**Mill Design**

Design of Mills for Flat Flanged Beams (74392). Fr. Denk. Ills. 1200 w. Blt Fe & Stl Pt—Nov., 1916. Serial, 1st part. Various mills are described.

**Mill Engines**

A New Reversing Rolling-Mill Engine (80986 A). Ills. 1200 w. Ir & Cl Trds Rev—Aug. 24, 1917. Detailed description of engine and its operation.

**Nickel Steel**

Properties and Structure of Nickel Steel (79844 A). S. W. Parker. Ills. 900 w. Iron Age—July 12, 1917. Effect of annealing at various temperatures. How to obtain best results.

**Nova Scotia**

The Iron and Steel Industry of Nova Scotia (75482). F. W. Gray. 1200 w. Can Min Jl—Dec. 15, 1916. Its progress and prospects.

**Open Hearth**

Open-Hearth Furnace of Large Capacity (79309 A). Ills. 1700 w. Iron Age—June 21, 1917. New 150-ton stationary unit of Central Iron & Steel Co., Harrisburg, Pa.

**Ore Deposits**

Iron Ores of the Adirondack Region (74335 A). Frank S. Witherbee, with discussion. 4000 w. Iron Age—Nov. 2, 1916. Reviews history and outlook.

The Supply of Acid Bessemer Ore (77017 A). H. H. Campbell. 2500 w. Iron Age—March 1, 1917. Survey of known low phosphorus ore deposits.

The Tayeh Iron Ore Deposits (77438 D). Chung Yu Wang. Ills. 1200 w. A I M E, Bul—March, 1917. General description and discussion of origin.

**Ore Reserves**

The Iron-Ore Reserves of the World (75724 D). H. H. Campbell. 2500 w. Iron Age—Jan. 4, 1917. Special No. Sufficient for 800 years if pig-iron production is constant.

**Ores**

Iron Ores of the Forest of Dean (79319 A). R. Moroni Kendrick. 2500 w. Ir & Cl Trds Rev—May 25, 1917. A plea for investigation and development.

**Oxides**

The Ferrous Iron Content and Magnetic Susceptibility of Some Artificial and Natural Oxides of Iron (79149 D). R. B. Sosman and J. C. Hostetter. 25 pp. A I M E, Bul—June, 1917. Experiments undertaken to find what relation exists between the ferrous iron percentage and the magnetic properties.

**Pacific Coast**

Outlook for Iron and Steel on the Pacific Coast (80189). Ernest A. Hersam. Also editorial. Ills. 6000 w. Min & Sci Pr—July 28, 1917. Steps desirable to promote a steel industry.

Outlook for Iron and Steel on the Pacific Coast (80506 A). Ernest A. Hersam. Ills. 3800 w. West Eng—Aug., 1917. The iron deposits and fuel supplies are discussed, and the opportunity to establish a western steel industry commented upon.

**Pickling**

Modern Economies in Pickling Steel (80413 A). J. H. Snyder. From a paper read before the Am. Drop Forge Assn. 2500 w. Iron Age—Aug. 9, 1917. Equipment to facilitate the process.

Economies in Pickling Steel (81973). 2500 w. Brs Wld—Oct., 1917. Details of mechanical devices introduced on account of the cost of labor and acid.

**Potash**

Potash as a Byproduct from the Blast Furnace (76189 D). R. J. Wysor, with bibliography. Ills. 32 pp. A I M E, Bul—Jan., 1917. Source of potash in the raw materials, methods of recovering, etc.

**Power Plants**

Blast Furnace and Steel Mill Power plant (78091 B). Richard H. Rice and Sanford A. Moss, with discussion. Ills. Engrs Soc of W Penn, Pro—March, 1917. Discussion of the most economical plant.

New Electric Steel Plant and Rolling Mill 078244 A). Ills. 2000 w. Iron Age—April 26, 1917. Plant of Ludlum Steel Co., Watervliet, N. Y.

The Respective Merits of Gas Engines and Steam Turbines as Applied to Modern Iron and Steel Works Practice (78830 A). Douglas L. Cooper, with short discussion. Read before Cleveland

Instn of Engrs. 4500 w. Ir & Cl Trds Rev—May 4, 1917. Considers which is more economical.

**Progress**

Technical Advances in Iron and Steel (75718 D). J. E. Johnson, Jr. 3500 w. Iron Age—Jan. 4, 1917. Special No. Few important developments.

**Prospecting**

Prospecting an Iron Ore Property (80067). J. F. Kellock Brown. Ills. 2500 w. Eng & Min Jl—July 21, 1917. Difficulties experienced, some of the costs.

**Pure Iron**

A Note on the Microstructure of Commercially Pure Iron Between Ar 3 and Ar 2 (81596 N). W. J. Brooke and F. F. Hunting. Ills. 6 pp. Ir & St Inst—Sept., 1917. The properties of pure iron.

**Quenching**

Notes on Some Quenching Experiments (78806 N). Lawford H. Fry. 8 pp. Ir & St Inst—May, 1917. Experimental study of the rate of cooling in various quenching media.

**Refractories**

Refractory Materials in South Yorkshire (75648 A). W. G. Fearnsides. From paper read before Midland Inst. of Min., Civ., & Mech. Engrs. 4500 w. Colly Gdn—Dec. 15, 1916. Deposits and their importance in the Sheffield district.

Properties of the Refractory Materials Used in the Iron and Steel Industry (78798 N). Cosmo Johns. 8 pp. Ir & St Inst—May, 1917. Properties required in any refractory material employed.

**Reversing Mill**

New Reversing Drive for Tin-Bar Mill at the Monmouthshire Steel and Tinplate Company's Works (80408 A). Ills. 2800 w. Ir & Cl Trds Rev—July 13, 1917. Details of an electrically-driven reversing mill recently installed.

**Rolling Mills**

Rail Rerolling Mill at Marion, Ohio (75668 A). Ills. 1200 w. Iron Age—Dec. 28, 1916. Details of new plant.

Mill Designs for Rolling Flat-flanged Beams (77072). F. Denk. Ills. 1200 w. Bt Fc & Stl Pt—March, 1917. Types of American mills.

Electric Drives for Reversing Rolling Mills (81270 N). D. M. Petty. Ills. 2500 w. Assn I S E E—Sept., 1917. Points that may be improved in the electric drive.

Plate Mills for Rolling Sheared Plates (81651). F. C. Biggert, Jr. Ills. 2500 w. Bt Fc & St Pt—Oct., 1917. Types of mills; method of rolling; production data, etc.

Rolling Mill Power Requirements (81652). F. Denk. 1500 w. Bt Fc & St Pt—Oct., 1917. Data obtained from tests on three high and reversing mills.

**Roll Passes**

The Elements of Roll Pass Design (79113). W. Trinks. Ills. 1200 w. Bt Fc & Stl Pt—June, 1917. Serial, 1st part. Fixing the limitations on possible reduction per pass.

**Roll Scale**

Roll Scale as a Factor in the Bessemer Process (76588 D). A. Patton and F. N. Speller. 3000 w. A I M E, Bul—Feb., 1917. Object of its use. Influence in quality, production, and cost.

Roll Scale as a Factor in the Bessemer Process (78130 D). 2500 w. A I M E, Bul—April, 1917. Disussion of paper of A. Patton and F. N. Speller.

**Russian Syndicates**

Iron and Steel Syndicates in Russia (77251 A). 4500 w. Ir & Cl Trds Rev—Feb. 23, 1917. Serial, 1st part. Information concerning the Association for the Sale of the Products of the Metallurgical Works of Russia.

**Scrap**

High Grade Pig Iron from Scrap Steel (80835 A). Edwin F. Cone. Ills. 2200 w. Iron Age—Aug. 30, 1917. Details of Ludlum electric furnace. Old material converted into iron by an electric process.

**Sintering Plant**

Sintering Flue Dust at Mingo Junction (78949 A). H. V. Schiefer. Ills. 3000 w Iron Age—May 31, 1917. Utilizing iron-bearing material. Details of plant.

**Slag**

Saving on Slag Through Efficient Crushing (74390). H. V. Schiefer. Ills. 1000 w. Blt Fc & Stl Pt—Nov., 1916. Reducing costs and making profit.

Some Causes of Colors in Furnace Slags (76504). Wallace G. Imhoff. Ills. 2000 w. Bt Fc & Stl Pt—Feb., 1917. Influence of temperature, volume and chemical composition.

The Viscosity of Blast-Furnace Slag (76602 D). Alexander L. Feild. Ills. 25 pp. A I M E, Bul—Feb., 1917. Methods, apparatus, furnace and other accessories used.

The Viscosity of Blast-Furnace Slag (77441 D). 3000 w. A I M E, Bul—March, 1917. Discussion of A. L. Field's paper.

Types of Different Blast Furnace Slags (77073). Wallace G. Imhoff. Ills. 2500 w. Bt Fc & Stl Pt—March, 1917. Serial, 1st part. Effect of certain elements and their importance.

The Viscosity of Blast-Furnace Slag (78127 D). 3000 w. A I M E, Bul—April, 1917. Discussion of A. L. Field's paper.

American Steel Slags and Their Uses (77954 A). Edwin F. Cone. 3500 w. Iron Age—April 12, 1917. Their manganese value.

Silica as a Component of Furnace Slags (77775). Wallace G. Imhoff. Ills. 1800 w. Bt Fc & Stil Pt—April, 1917. Slag characteristics due to silica.

Alumina as a Component of Furnace Slag (79111). Wallace G. Imhoff. Ills. 2000 w. Bt Fc & Stl Pt—June, 1917. Characteristics due to alumina.

Sulphur as a Component of Furnace Slag (79805). Wallace G. Imhoff. Ills. 2500 w. Bt Fc & St Pt—July, 1917. The effect of combined sulphur on furnace driving.

Sulphur as a Component of Furnace Slag (80346). Wallace G. Imhoff. Ills. 3000 w. Bt Fc & St Pt—Aug., 1917. Causes of free sulphur, etc.

The Superheating of Slags and Metals During Refining, Smelting and Alloying Operations (80545 A). J. E. Fletcher. Ills. 4500 w. Ir & Cl Trds Rev—July 27, 1917. A review of the slag function problem, presented before the Soc. of Chem. Ind. at Birmingham, Eng.

Lime as a Component of Furnace Slag (80917). Wallace G. Imhoff. Ills. 2200 w. Bt Fc & Stl Pt—Sept., 1917. Classification of hot and cold lime; properties of cinder, etc.

See same heading under ELECTRICAL ENGINEERING, *Electro-Chemistry*.

**Smelting**

Chemical Reactions of Iron Smelting (78998 A). Walther Mathesius. Read before Am. Ir. & St. Inst 4000 w Met & Chem Eng—June 1, 1917 Reviews the reactions in the blast furnace of to-day.

**Smokeless Operation**

The Possibilities of Smokeless Operation of Heating Furnaces and Soaking Pits (78237 B). 35 pp. Engrs' Soc West Penn, Pro—April, 1917. A topical discussion.

**Steel**

A Method for Distinguishing Sulphides from Oxides in the Metallography of Steel (75249 D). George F. Comstock. Ills. 1500 w. A I M E, Bul—Dec., 1916. Eetching with boiling alkaline sodium picrate.

Metals and Alloys in the Steel Industry (75717 D). DeCourcy Browne. Ills. 2500 w. Iron Age—Jan. 4, 1917. Special No. Review of conditions in 1916.

Ferro-Uranium (77803 B). H. W. Gillett and E. L. Mack. 5000 w. Jl Ind & Eng Chem—April, 1917. Experimental study.

The Testing of Steel (78197 A). Harry Brearley. Abstract of paper before the Manchester Assn. of Engrs. 5000 w. Mech Engr—April 6, 1917. Methods explained.

Hammering, Pressing or Rolling Steel (79218 A). John L. Cox. Ills. 3500 w. Iron Age—June 14, 1917. From paper before Am. Ir. & St. Inst. Fields of the press and the hammer.

Report of Committee A-1 on Steel (79496 N). 39 pp. Am. Soc. Test. Mat —June, 1917. Proposed revisions in standards and specifications for steel and steel products.

The Manufacture of Steel for Aircraft (81028). Ills. 4000 w. A A Wkly—Sept. 10, 1917. Study of processes employed in production of steel and the characteristics and uses of the material.

Treatment and Selection of Steel (80841 B). John F. Keller. Ills. 5400 w. S A E, Jl—Aug., 1917. Serial, 1st part. Properties and determination of critical temperatures of different steels, effect of mechanical working, methods of selectting, etc.

The Penetration of the Hardening Effect in Chromium and Copper Steels (78799 N). L. Grenet. 8 pp. Ir & St Inst—May, 1917. Experiments on crucible steels from Firminy, to determine the influence of copper on the depth of the hardening effect with chromium.

Steel Manufacture (82042). 1700 w. Times Eng Supp—Sept. 28, 1917. British and foreign practice in open-hearth steel. From the Iron and Steel Institute.

Investigation Upon a Cast of Acid Open-Hearth Steel (81600 N). T. D. Morgans and F. Rogers. Ills. 10 pp. Ir & St Inst—Sept., 1917. Work to determine the general quality and uniformity of the acid open-hearth steel made for the manufacture of H. E. shell.

The Acid Open-Hearth Process (81601 N). F. Rogers. Diagrams. 12 pp. Ir & St Inst—Sept., 1917. Suggestions upon steel-making by all the six usual processes, particularly the acid open-hearth.

Les Aciers Bessemer, Martin, Électriques et au creuset (82020 B). G. Charpy. 5600 w. Gen Civ—Sept. 29, 1917. Bessemer, open-hearth, electric and crucible steels compared.

Physico - Chemical Properties of Chrome-Nickel Steels (81801 A). Herbert J. French. Ills. 1500 w. Met & Chem Eng—Oct. 15, 1917. Properties which may be developed by the heat treatment.

Some Relations Between the Magnetic and the Mechanical Properties of Steel and of Nickel (76783 A). S. R. Williams, with discussion. Ills. 18 pp. Cleve Eng Soc, Jl—Jan., 1917. A study.

Mayari and Nickel Steels Compared (79101 A). S. W. Parker. 1000 w. Iron Age—June 7, 1917. Can be substituted for each other as far as tensile strength is concerned. Effects of neat treatments.

Alloy or Carbon Steel Versus Carbonized (80081 A). E. F. Lake. 1800 w. Mech Wld—July 6, 1917. Serial, 1st part. Read before the Steel Treating Research Club. High-grade carbon steels, etc.

See also same heading under MECHANICAL ENGINEERING, *Aeronautics*.

**Steel Industry**

War Tasks of the German Steel Industry (80139 A). Otto Petersen. (Abstract translation). 1500 w. Iron Age—July 26, 1917. Supply of raw materials.

The American Steel Industry (81306 A). 2500 w. Met & Chem Eng—Sept. 15, 1917. Editorial review of conditions since the war.

**Steel Plants**

Equipping Plant for Heavy Steel Work (76505). Charles C. Lynde. Ills. 1500 w. Bt Fc & Stl Pt—Feb., 1917. Layout for handling heavy stock without hand labor.

Steel Plant Enlarged Under Difficulties (79233). Ills. 2000 w. Eng News-Rec—June 14, 1917. Scant room for building additions to Steelton works.

The Electric Motor in the Steel Mill (74784 A). H. F. Stratton. From a paper read in Phila. before the Assn. of Ir. & Steel. Elec. Engrs. 4000 w. Iron Age—Nov. 23, 1916. Dangers from improper control arrangement of mechanically connected direct-current motors.

Five Organizations Build Vast Steel-Plant Extension (78909). Ills. 1200 w. Eng News-Rec—May 24, 1917. Work to cost many millions at Sparrows Point, Md.

New England Steel Bar and Wire Plant (78447 A). Ills. 2500 w. Iron Age—May 3, 1917. Features of plant of Peter A. Frasse & Co., Hartford, Conn.

New Iron and Steel Works Construction (75730 D). 15500 w. Iron Age—Jan. 4, 1917. Special No. Plants now building.

United Alloy Steel Corporation's Works (75728 D). Ills. 4000 w. Iron Age—Jan. 4, 1917. Special No. Equipment of electrically operated plant.

La Fonte Synthétique (80052 B). A Pawlowski. Ills. 2000 w. La Nat—July 14, 1917. Steel works at Livet, France.

**Steel Scrap**

Reclamation of High-Speed Steel 1400 w. Machy—May, 1917. Details of practice of utilizing worn-out high-speed tools.

**Steel Tests**

The Microscopy of Steel (79520 N). Bertram P. Smart. Ills. 1700 w. Min & Eng Rev—May, 1917. Outlines methods adopted as a means of testing steel. Condensed from lecture to the Engng. Assn. of N. S. W.

**Steel Trade**

What Peace Means to the Steel Trade (80987 A). S. A. Benner. 2000 w. Ir & Cl Trds Rev—Aug. 24, 1917. From a paper issued by the Am. Steel Export Co. The effect of increased production and conditions caused by the war.

**Steel Work**

Practice in Bridge and Girder Yards From a Theoretical Standpoint (80115 A). George Kenworthy. Ills. 3000 w. Engr—July 6, 1917. Serial, 1st part. Design and manufacture of structural steel work, discussing certain weaknesses.

**Steel Working**

Martelage, Forgeage Et Laminage (77558 B). G. Charpy. Ills. 4000 w. Gen Civ—Feb. 17, 1917. Results of tests on specimens treated in various ways: hammering, rolling, etc.

**Stove Design**

Late Progress in Hot Blast Stove Design (74391). Arthur J. Boynton. 3000 w. Blt Fc & Stl Pt—Nov., 1916. Serial, 1st part. Summarizing betterments and giving operating data.

**Sulphur**

The Determination of Sulfur in Iron and Steel (75110 B). H. B. Pulsifer. Ills. 7500 w. Jl Ind & Eng Chem—Dec., 1916. Bibliography covering 285 original articles relating to the determination of sulphur in ferrous materials. Methods.

**Sulphur Effect**

The Effect of Sulphur on Low-Carbon Steel (78134 D). 3500 w. A I M E, Bul —April, 1917. Discussion of Carle R. Hayward's paper.

Sulphur's Effects on Low Carbon Steels (74690). Carle R. Hayward. Ills. 1800 w. Stl & Iron—Nov., 1916. Further tests. Findings check those of Dr. Unger.

**Sulphur Ore**

Large Pyrrhotite Deposits in Maine (82086). 2000 w. Eng & Min Jl—Oct. 27, 1917. Sulphides of iron suitable for sulphuric acid manufacture; residue marketable as iron ore.

**Surface Tension**

The Influence of Surface Tension Upon the Properties of Metals, Especially of Iron and Steel (78805 N). F. C. Thompson. Ills. 20 pp. Ir & St Inst—May, 1917. Explanation of the effects.

**Synthetic Fusion**

La Fonte Synthétique (81411 B). Ch. Dantin. 1800 w. Gen Civ—Sept. 1, 1917.

Discussion of certain methods of recarburation of iron in the process of making steel.

**Tin Plate**

The Detinning and Analysis of Tin Plate (77967 N). George W. Heise and Amando Clemente. 2200 w. Phil Jl Sci July, 1916. Study of methods. Recommends use of electric current.

**Temperature**

Temperature Measurements in Bessemer and Open-Hearth Practice (76601 D). George K. Burgess. 5000 w. A I M E, Bul—Feb., 1917. Applications of pyrometric methods to all except the converter type.

Temperature Measurements in Bessemer and Open-Hearth Practice (78738). George K. Burgess. Tables. 29 pp. U S Bur Stds, Tech paper 91—May 8, 1917. Shows that well-known pyrometric methods may be applied with accuracy.

**Washed Metal**

Washed Metal in Special Steel Making (75834). Henry D. Hibbard. Ils. 2200 w. Bt Fc & Stl Pt—Jan, 1917. As used by Brier Hill Co. to secure purified product.

**Wrought Iron**

Carbonization of Wrought Iron in Gases (75081). F. W. Harbord. Ils. 1400 w. Blt Fc & Stl Pt—Dec., 1916. Effect at temperatures between 400 deg. and 500 deg. C.

The Influence of High Temperature Upon the Elastic and Tensile Properties of Wrought Iron (79893 A). Frank A. Epps and E. Olney Jones. Ils. 4000 w. Met & Chem Eng—July 15, 1917. Investigates the variation of the elastic limit and other properties.

Some Unusual Features in the Microstructure of Wrought Iron (81220 D). Henry S. Rawdon. Ils. 19 pp. A I M E, Bul—Sept., 1917. The usual structure and nature of the unusual features.

## MINE OPERATION

**Alaska**

Mining at Juneau, Alaska (80330). Floyd W. Parsons. Ils. 1500 w. Eng & Min Jl—Aug. 2, 1917. Work on railway; shortage of mining labor; methods adopted under difficulties.

Alaska Juneau 1520 Ft. Raise (81786). C. K. White. Ils. 1200 w. Eng & Min Jl—Oct. 13, 1917. Inclined raise driven in the foot wall, parallel to the orebody to serve as an ore pass and for ventilation.

**Andes**

Mining in the Argentine Andes (80907). A. W. Allen. Ils. 4500 w. Eng & Min Jl—Sept. 1, 1917. Ores of silver, copper, lead and other metals. Climate not good; labor discouraging.

**Bells**

Underground Signalling Bells (80119 A). L. Fokes. Ils. 2500 w. Ir & Cl Trds Rev—July 6, 1917. Applying short-circuited parallel winding.

**Blasting**

The Primary of Charges and Firing of Blasts (75468). Thomas M. Knight. Ils. 1200 w. Eng & Con—Dec. 20, 1916. Methods.

**Bore-Holes**

On the Measurement of Temperature in Bore-Holes (76051 B). John Johnston and L. H. Adams. 22 pp. Econ Geol—Dec., 1916. Precautions essential to secure accurate results, and limitations of accuracy of various methods.

**British Columbia**

The Britannia Mine and Mill (74579). T. A. Rickard. Ils. 5600 w. Min & Sci Pr—Nov. 11, 1916. History and description of the largest copper mine in Canada.

Conditions at the Reserve Mine, Nanaimo, B. C. (76872). James Ashworth. Diagram. 1200 w. Cl Age—Feb. 24, 1917. Accidents due to carelessness and disregard of safety requirements. Suggestions.

**California**

The Black Oak Mine (79465). W. H. Storms. Ils. 2200 w. Min & Sci Pr—June 23, 1917. Mine workings; geological features, etc., of this gold mine.

**Canada**

A General Summary of the Mineral Production of Canada During the Calendar Year 1915. (76005 N). John McLeish. 45 pp. Can Dept Mines—No. 424. Statistics.

**Caving System**

Losses Incident to the Caving of Ore Bodies (77870). R. G. Sampson. Ils. 2000 w. Min & Sci Pr—April 7, 1917. Methods of reducing waste in caving of ore bodies.

**Cementation Process**

Cementation Process as Applied to Mining (Francois System) (77650 A). Thomas Blandford. 3800 w. Colly Gdn—March 9, 1917. Applications described.

**China**

The Shui-Ko-Shan Zinc & Lead Mine in Hunan, Central China (77293 A). A. S. Wheler and S. Y. Li. Ils. 3500 w. Min Mag—Feb., 1917. Particulars of a mine operated by modern methods. Information as to costs.

**Churn Drilling**

Underground Churn Drilling at Old Dominion (77880). Guy W. Bjorge. Ills. 1800 w. Eng & Min Jl—April 7, 1917. Used for bore holes for ventilation. Results and costs.

**Colorado**

Operating Conditions in the San Juan Country, Colorado (76488). L. Hall Goodwin. Ills. 2500 w. Eng & Min Jl—Feb. 8, 1917. Mining difficulties in very rugged mountains.

**Coöperation**

Coöperative Effort in Mining (75255 D). 1500 w. A I M E, Bul—Dec., 1916. Joseph P. Hodgson's paper is discussed.

**Cross Cutting**

Methods and Costs of Cross Cutting in Mines of Amador County, California (81278). Edwin Higgins, in *Bul.* issued by California Metal Producers' Assn. 2500 w. Eng & Con—Sept. 19, 1917. Outlines important factors based on actual mining operations.

Cost of Crosscutting on the Mother Lode (80484). Abstract of Bul. No. 5, Calif. Metal Prod. Assn. Edwin Higgins. 1500 w. Eng & Min Jl—Aug. 11, 1917. Compares cost of driving 10 crosscuts, giving details of methods, etc.

**Dredge**

The Cache Creek Dredge Alaska (75491). Sumner S. Smith. Ills. 1200 w. Min & Sci Pr—Dec. 23, 1916. Details of new dredge and its working.

**Dredging**

Dredging for Minerals: Past and Present (75360). F. W. Payne. 1500 w. Min & Eng Wld—Dec. 16, 1916. Historical review.

Mineral Dredging Operations of the World (75740). Ills. 6000 w. Min & Eng Wld—Jan. 6, 1917. Brief review.

Righting a Wrecked Gold Dredge (78631). Lewis H. Eddy. Ills. 2000 w. Eng & Min Jl—May 12, 1917. Natomas No. 7 all-steel gold dredge capsized in April, 1916. Righted in six months, eleven days at a cost of $108,248.

Dredging in the Nechi Valley (81113). 2000 w. Eng & Min Jl—Sept. 15, 1917. Results in Colombia are given.

**Drills**

Some Historic Rock Drills (76105). H. B. Willmott. Ills. 2500 w. Can Min Jl —Jan. 15, 1917. Historical review, with descriptions.

Lubrication of Rock Drills (77044). Charles C. Phelps. Ills. 1500 w. Eng & Min Jl—March 3, 1917. Importance and methods.

The Testing and Application of Hammer Drills (77882). Benjamin F. Tillson. Ills. 8500 w. Eng & Min Jl—April 7, 1917. Discussion and mathematics of drilling and methods used by the New Jersey Zinc Co.

Drill Bits and Drill Steel for Metal Mining (78632). George H. Gilman. Ills. 9500 w. Eng & Min Jl—May 12, 1917. A study of the choice of machine-drill bits.

**Electrification**

Bethlehem Chile Iron Mines Electrification (74257 A). W. S. Bourlier. Ills. 4000 w. Gen Elec Rev—Nov., 1916. Details and features of a property in Chile.

**Explosives**

Use of Permissible Explosives (75743). Extracts from Pro. of Mine Inspec. Inst. 2500 w. Cl Age—Jan. 6, 1917. Present practice in United States and Canada.

Explosion at the Reserve Mine, Nanaimo, B. C. (78046 A). James Ashworth. Ills. 3500 w. Colly Gdn—March 23, 1917. Official report with probable cause of the accident.

Initiation of Explosives (77809 B). Walter Arthur. 3500 w. Jl Ind & Eng Chem—April, 1917. Reviews the development of explosives and methods used.

La Fabrication Des Principales Matieres Explosives (78862 B). J. Meunier. 7100 w. Gen Civ—Apr. 28, 1917. Serial, 1st part. Manufacture of high explosives. General methods and characteristics.

Permissible Explosives Tested Prior to January 1, 1917 (80438). Spencer P. Howell. 15 pp. U S Bur Mines—Tech paper 169. Lists, classes, ingredients, precautions, etc.

**Gas**

Limits of Complete Inflammability of Mixtures of Mine Gases and of Industrial Gases with Air (80578). George A. Burrell and Alfred W. Gauger, with bibliography. 2000 w. U S Bur Mines—Tech paper 150. Summary of experiments.

**Grades**

Grade Revision of Underground Roads (78363). R. D. Brown. 3500 w. Cl Age —Apr. 28, 1917. How to secure safe and efficient underground haulage.

**Haulage**

Economics of Grade Revision for Underground Haulage (78177). R. D. Brown. 2000 w. Cl Age—April 21, 1917. Economic location of underground railways.

A Successful Gasoline Locomotive (77894). Ills. 1000 w. Cl Age—April 7, 1917. Locomotive weighing 8¼ tons and known as type L-50.

**Headframes**

The Design of Headframes (77887). Floyd L. Burr. Ills. 7000 w. Eng &

Min Jl—April 7, 1917. Classification and discussion of types.

A Steel Headframe in Ecuador (80481). W. A. Wolf and T. L. Chapman. Ills. 1800 w. Eng & Min Jl—Aug. 11, 1917. Details of design and erection of a 90-ft. steel headframe at Zaruma mines.

**High Costs**

Symposium on the High Cost of Mining, Milling and Smelting (76489). 8000 w. Eng & Min Jl—Feb. 3, 1917. Report of discussion at Dec. meeting of Min. & Met. Soc. of Am.

**Hoisting**

The United Verde Underground Hoist (77884). T. D. Hawkins. Ills. 3500 w. Eng & Min Jl—April 7, 1917. Hoisting problem and its solution.

Comparison of Electric Winding Systems (78049 A). S. E. T. Ewing. From paper before S. Af. Instn. of Elec. Engrs. 3500 w. Colly Gdn—March 23, 1917. Principal operations required of main winding engines.

Recent Developments in the Design of Hoisting Engines (77885). Frederick W. O'Neil. Ills. 2500 w. Eng & Min Jl—April 7, 1917. Comparison of many important hoists with comments on efficiency.

A New Electric Mine Hoist at Butte, Montana (79864 D). R. S. Sage. Ills. 3500 w. A I E E, Pro—July, 1917. Details of one of the two largest installations in this country of the Ilgner-Ward Leonard type. Data on tests.

Notes on Three Phase and Ward Leonard Winding Equipments (79955 N). A. L. Ballard, with discussion. Diagrams. 15 pp. So Af Inst of Elec Engrs, Trans—April, 1917. Limits and advantages.

A Fourteen Hundred Foot Raise (80070). Charles H. Foreman. Ills. 1500 w. Eng & Min Jl—July 21, 1917. Details of operations.

Electric Mine Hoists (75104). Graham Bright. Ills. 2500 w. Elec Jl—Dec., 1916. Each installation a separate problem. Systems.

See same heading under ELECTRICAL ENGINEERING, *Power Applications*.

**Hydraulic Packing**

Hydraulic Packing at Ballarpur Colliery, Central Provinces (74739 A). R. S. Davies. 1500 w. Colly Gdn—Nov. 3, 1916. Reasons for the introduction of hydraulic packing and its success.

**Hydraulic Sluicing**

Hydraulic Sluicing for Gold and Tin (81931 N). Arthur H. P. Moline. Ills. 5000 w. Min & Eng Rev—Sept. 5, 1917. Serial, 1st part. Hydraulic sluicing with the aid of centrifugal pumps.

**Inspection**

Efficiency in Mine Inspection (78178). J. J. Rutledge. 1500 w. Cl Age—April 21, 1917. Need of careful inquiry into health and safety of workers.

**Inspiration**

Operations and Methods in Use at the Inspiration Property, Arizona (74581). Map and flow sheet. 700 w. Min & Eng Wld—Nov. 11, 1916.

**Latrines**

Underground Latrines for Mines (75245). Joseph H. White. Ills. 15 pp. U S Bur Mines—Tech. paper 132. Dangers and practical methods of eliminating them.

**Law**

Abstracts of Current Decisions on Mines and Mining, May to August, 1916 (77262). J. W. Thompson. 68 pp. U S Bur Mines—Bul 143.

Mining Laws of Brazil (77627). Henry Thomas. 1500 w. Eng & Min Jl—March 24, 1917. Laws revised in 1915. Present requirements.

Abstracts of Current Decisions on Mines and Mining Reported from September to December, 1916 (79370). J. W. Thompson. 80 pp. U S Bur Mines—Bul 147.

The Extralateral Right: Shall It Be Abolished (79033). William E. Colby. 5000 w. Min & Sci Pr—June 2, 1917. Suggestions as to considerations that should apply in any attempt at revision.

The Miami Appeal (79466). 11400 w. Min & Sci Pr—June 23, 1917. Minority opinion of the U. S. Circuit Court of Appeals, Philadelphia.

**Leaching**

Leaching Tests at New Cornelia (75253 D). 3500 w. A I M E, Bul—Dec., 1916. H. W. Morse and H. A. Tobelmann's paper is discussed.

Leaching of Copper Ores at Bisbee, Arizona (79984 N). Joseph Irving. Ills. 2500 w. Inst Min & Met, Bul—June 28, 1917. Results from leaching with sulphuric acid and recovering the copper by precipitation on iron.

**Leasing**

Mine Operation on the Leasing System (81111). Henry M. Adkinson. 2200 w. Eng & Min Jl—Sept. 15, 1917. Advantages for mines with a future.

**Loading Pocket**

Loading Pocket in Burra Burra Mine (77883). Walter R. Hodge. Ills. 3500 w. Eng & Min Jl—April 7, 1917. Concrete and steel underground loading pocket to serve inclined skip hoisting.

**Lode Mining**

Lode Mining Industry on Vancouver Island, B. C. (81139). W. M. Brewer.

1500 w. Can Min Inst, Bul—Sept., 1917. Types of deposits; magnetite and copper, with other metals.

**Longwall**

Longwall Mining at Steubenville, Ohio (78175). Walter G. Burroughs. Ills. 1500 w. Cl Age—April 21, 1917. Detailed description.

**Lubrication**

Lubrication of Mine Machinery (79126 N). James A. Boyd. 2000 w. Can Min Inst, Bul—June, 1917. Certain phases are discussed: steam cylinders, filtration of oil, pit and mine car lubrication, cost and other details.

**Methods**

Deep-Lead and Drift-Mining (74612 A). M. T. Taylor. Ills. 5000 w. Min Mag—Oct., 1916. Methods employed in mining auriferous deep leads in Victoria.

Mining Methods at the Magpie Iron Mine (77367 N). A. Hasselbring. Ills. 2000 w. Can Min Inst, Bul—March, 1917. Mine in Ontario. A body of siderite being mined and made into merchantable ore by roasting.

Mining Methods Illustrated in Miniature (77878). W. R. Crane. Ills. 1800 w. Eng & Min Jl—April 7, 1917. Clay models showing sections through stopes and methods of timbering.

Saving a Shrinkage Slone by an Electric Blast (77716). S. Ford Eaton. Ills. 2200 w. Eng & Min Jl—March 31, 1917. Details of development and charge for an electric blast. Saved 20,000 tons of ore.

Mining Methods in Great Britain (78606). Ills. 3000 w. Cl Age—May 12, 1917. Review of methods and difficulties.

**Metal Mining**

Electricity Applied to Metal Mining (75101). W. N. Clark. Ills. 1800 w. Elec Jl—Dec., 1916. Recent advances and applications.

Metal Mining in 1916 (75789). 4500 w. Min & Sci Pr—Jan. 6, 1917. General review. Copper, lead and zinc.

Methods of Underground Metal Mining (77876). F. W. Sperr. Ills. 2500 w. Eng & Min Jl—April 7, 1917. Diagrammatic classification of 162 methods.

**Mine Dust**

Notes on Dust Prevention in Mines (79931 N). Arthur C. Whittome and J. H. Veasey. Ills. 5500 w. S Af Instn Engrs, Jl—May, 1917. Allaying of dust and improvement of ventilation, with description of the "Apex" water-blast.

**Mine Fires**

Mine Fire Methods Employed by the United Verde Copper Co. (75256 D). 3500 w. A I M E, Bul—Dec., 1916. Discussion of Robert E. Talley's paper on the subject.

The Pennsylvania Mine Fire, Butte, Mont. (76591 D). C. Edwin Nighman and Rollins S. Foster. Plans. 6000 w. A I M E, Bul—Feb., 1917. Methods used in rescuing men and extinguishing the underground fire.

**Mine Hospitals**

Design of Small Mine Hospitals (81782). O. L. Puckett and J. B. De Hart. Ills. 2500 w. Cl Age—Oct. 13, 1917. Hospitals costing from $1,300 to $7,000.

**Mine Labor**

Organization of Mine Labor on the Witwatersrand (77978). E. M. Weston. 4500 w. Eng & Min Jl—April 14, 1917. Causes and results of inefficiency.

**Mine Lamps**

Portable Electric Mine Lamps (77800 A). F. T. Forster. Ills. 3500 w. Gen Elec Rev—April, 1917. Development, requirements, and description.

Portable Miners' Lamps (78140 D). 17 pp. A I M E, Bul—April, 1917. Discussion of Edwin M. Chance's paper.

Development in Safety Lamps (77896). James Ashworth. Ills. 1500 w. Cl Age—April 7, 1917. Approved lamps, dangers, features; types, etc. Principles of operation.

Portable Miners' Lamps (76597 D). Edwin M. Chance. 3500 w. A I M E, Bul—Feb., 1917. Types, their advantages and disadvantages.

Acetylene Mine Lamps (79947 A). William Maurice. Ills. 6000 w. Ir & Cl Trds Rev—June 22, 1917. Abstract of paper before the Instn of Min Engs.

Acetylene Mine Lamps (81145 N). William Maurice, with discussion. Ills. 31 pp. Instn Min Engrs, Trans—Aug., 1917. General principles of acetylene lighting, and the application to the design and use of open flame-lamps.

**Mine Locomotives**

A Narrow-Gage Alternating Current Mine Locomotive (78180). Rudolph W. Van Norden. Ills. 4000 w. Eng & Min Jl—April 21, 1917. Construction of a. c. locomotive for 18-in. gage track.

**Mine Motors**

Ball-Bearing Motors in Modern Mine Equipment (80074). Robert Hirsch. Ills. 1000 w. Cl Age—July 21, 1917. Increased efficiency and decreased wear.

**Mine Power**

Forms of Electric Power Best Suited For the Various Loads Encountered in the Operation of Bituminous Coal Mines (79868 D). R. L. Kingsland. 2000 w. A I E E, Pro—July, 1917. Applications for drilling, cutting, hauling, pumping, lighting and ventilation.

The Application of Electricity to Mining in the Cœur D'Alenes (76411 A). Ben Olsen. Map & Ills. 2500 w. Gen Elec Rev—Feb., 1917. Advantages and economy.

The Electrification of the Red Ore Mines of the Tennessee Coal, Iron & R. R. Company (76413 A). Howard M. Gassman. Ills. 2500 w. Gen Elec Rev—Feb., 1917. Example of advantages and economy.

Electrical System of the Rand Power Companies, with Special Reference to Methods of Operation and Experience (76361 N). Bernard Price. Ills. 50 pp. So Af Inst Engrs, Trans—Nov., 1916. Details of the layout and operating characteristics of one of the largest power schemes of today.

Large Generator and Transformer Failures on the Rand Power Companies' Systems (76371 N). A. E. Val Davies, with short discussion. Ills. 4500 w. So Af Inst Engrs, Trans—Oct., 1916. Examples of breakdowns during four years.

**Mine Pumping**

Mine Pumping Equipment (77879). Whitman Symmes. Ills. 4500 w. Eng & Min Jl—April 7, 1917. Details of equipment on the Comstock Lode, with discussion of problems.

**Mine Pumps**

Centrifugal Pumps for Mine Service (81332). Herbert Axford. 7000 w. Cl Age—Sept. 22, 1917. Its successful installation and operation require only care and judgment.

**Mine Report**

Gold, Silver, Copper, and Lead in South Dakota and Wyoming in 1915 (74445 N). Charles W. Henderson. 14 pp. U S Geol Surv, I:13—Nov. 3, 1916. Production, conditions, and review by counties.

Butte & Superior Mining Co. (78538). 3000 w. Eng & Min Jl—May 5, 1917. Almost full report for year ending Dec. 31, 1916.

**Mine-Roof Supports**

Resistance of Artificial Mine-roof Supports (81588 D). William Griffith. Ills. 13 pp. A I M E, Bul—Oct., 1917. Information in regard to the sustaining power of artificial mine-roof supports.

**Mine Sanitation**

Underground Mine Sanitation (81640). A. J. Lanza. 2000 w. Eng & Min Jl—Oct. 6, 1917. Reviews unsanitary conditions in metal mines.

**Mine Subsidence**

Some Theories on Mine Subsidence (79040). J. F. Kellock Brown. Ills. 3000 w. Cl Age—June 2, 1917. Analysis of the manner the mine roof acts after part of the support is withdrawn.

**Mine Ventilation**

Safe and Efficient Mine Ventilation (76769). D. D. Dodge, Joseph Smith, and Henry King. 1500 w. Cl Age—Feb. 17, 1917. Review of methods.

Ventilation in the Rincon Mine (78044). Blamey Stevens. 2500 w. Min & Sci Pr—April 14, 1917. Unusual conditions and method of overcoming the trouble, with economic results and better air for workers.

Mine Ventilation (79959 D). Joseph J. Walsh. 2000 w. Am Soc Ht & Vl Engrs, Jl—July, 1917. Agencies tending to vitiate the air, design and proportion of a ventilating fan, location, capacity, etc.

Necessity of Mechanically Produced Ventilation for Metal Mines (81740 A). George S. Rice. 2500 w. Sfty Eng—Sept., 1917. Shows the importance of mechanical ventilation.

**Mine Water**

Methods of Softening and Filtering Mine Water (75187). M. F. Newman. Ills. 1000 w. Min & Eng Wld—Dec. 9, 1916. Types of softeners.

Handling Mine Waters (75687). L. B. Smith. Read before the Coal Min. Inst. of Am. Ills. 3500 w. Cl Age—Dec. 30, 1916. Need of large pumping capacity.

**Mining**

Mining: The Great Adventure (79253). T. A. Rickard. 7000 w. Min & Sci Pr—June 16, 1917. Address before Colo. Sch. of Mines. Reviews the romantic history of mining.

**Mining Bureaus**

The Scope and Value of State Mining Bureaus (79781). E. K. Soper. Abstract of address before the Idaho Mining Assn., Jan. 16, 1917. 3000 w. Eng & Min Jl—July 7, 1917. Extent and value of metals and non-metals.

**Mining Cables**

Protection of Mining Cables (76149 A). Chris. Jones. Ills. 1500 w. Ir & Cl Trds Rev—Jan. 5, 1917. Systems for protecting against faults.

**Mining Machinery**

Mining Machinery as a Factor in the War (80075). Ills. 1500 w. Cl Age—July 21, 1917. Importance of proper equipment in maintaining production.

The Alternative-Current Mining Machine (77058). G. E. Butt. Ills. 1500 w. Cl Age—March 3, 1917. Advantages over machines of the d. c. type.

**Models**

Mine Models (78122 D). H. H. Stock. Ills. 1600 w. A I M E, Bul—April, 1917. Models to illustrate typical methods of mining, developed at the University of Illinois.

**Nickel**

Mining Methods at Creighton (78167). T. F. Sutherland. Ills. 2000 w. Can Min Jl—April 15, 1917. Details of method.

**1916**

Mining in 1916 (75928). 12500 w. Eng & Min Jl—Jan. 13, 1917. Reviews of mining in Colorado, Utah, Oregon, and Idaho.

**Ore Deposits**

Metals and Ores in 1914 and 1915 (75661 N). J. P. Dunlop. 11 pp. U S Geol Surv, I : 22—Dec. 27, 1916. Production.

**Pitwood**

Pitwood Supplies (80984 A). Map. 3000 w. Ir & Cl Trds Rev—Aug. 17, 1917. Particulars of the district pitwood committees and the organization for the control of pitwood in Great Britain.

**Powder-Thawer**

Perseverance Mine Powder-Thawer (79199). D. J. Argall. Ills. 800 w. Min & Sci Pr—June 9, 1917. Plans of a modern powder-thawer, with working drawings and costs.

**Power Plants**

Centralized Power Plant (75352). J. M. Poyner. Ills. 2000 w. Cl Age—Dec. 16, 1916. Interesting example of modern power centralization operating 26 mines in W. Va. and Md.

Diesel Engines Versus Steam Turbines for Mine Power Plants (75260 D). 3500 w. A I M E, Bul—Dec., 1916. Herbert Haas' paper is discussed.

Power Plant of the Burro Mountain Copper Co. (75257 D). 1000 w. A I M E, Bul—Dec., 1916. Discussion of Charles Legrand's paper.

Diesel Engines Versus Steam Turbines for Mine Power Plants (78728 D). 2500 w. A I M E, Bul—May, 1917. Author's reply to discussion of the paper of H. Haas.

**Power Transmission**

The Wave-Transmission System and Its Use in Drilling (75506). E. M. Weston. Ills. 3000 w. Eng & Min Jl—Dec. 30, 1916. Describes a sixth method of power transmission and its application to drilling.

**Quarrying**

Sandstone Quarrying in the United States (78642 A). Oliver Bowles. Ills. 133 pp. U S Bur Mines—Bul. 124. Location of workable deposits, outlining the most efficient and economical methods of quarrying.

Quarrying Limestone Underground (79044). Raymond B. Ladoo. Ills. 2500 w. Eng & Min Jl—June 2, 1917. Found more economical than open work.

**Queensland**

Queensland Mining Industry (78025 N). Henry Marshall. 19 pp. Qnsd Gov Min Jl—March 15, 1917. Review of the year 1916.

**Rand**

Rand Mining Economics: Some Salient Unappreciated Issues (78654 N). G. A. Denny, with short discussion. Ills. 45 pp. So Af Instn Engrs, Jl—April, 1917.

Mining Problems on the Rand (78924). H. Foster Bain. Ills. 4500 w. Min & Sci Pr—May 26, 1917. Serial, 1st part. Some of the unsolved problems and points in current practice. Interesting comments on conditions there.

Notes on the support of the Underground Workings in the Mines of the Rand (81820 N). Percy Cazalet. 6000 w. So Af Instn Engrs, Jl—Aug., 1917. Methods of mining and the resulting problems. Sand filling, timbering, etc.

Systematic Packing Underground at the Ferreia Deep Mine (81821 N). G. Hildick Smith and Paul Selby. Ills. Also discussion, including paper by Percy Cazalet. 18 pp. So Af Instn Engrs, Jl—Aug., 1917. Methods found most efficient.

**Refrigeration**

The Romance of Refrigeration and Its Application to Mining (78916). Andrew D. Brydon. Ills. 4000 w. Cl Age—May 26, 1917. Its use in sinking mine shafts through running ground.

**Repairs**

Equipment Repairs in a Gold and Silver Mine (81903). Ills. 1500 w. Am Mach—Oct. 18, 1917. Unique method of threading large pipe is shown, and other repairs.

**Reworking**

Working Over an Old Mine (75049). F. W. Campbell. Ills. 1200 w. Cl Age—Dec. 2, 1916. Novel systems and methods employed.

**Rock Drills**

Saving Effected with New and Modern Rock Drills Over Obsolete (75671). Letson Balliet. 3000 w. Min & Eng Wld—Dec. 30, 1916. Test made at Tonopah.

**Russia**

Metal Mining in Russia (77218). Sydney H. Ball and Bela Low. Ills. 14 pp. Eng & Min Jl—March 10, 1917. Reviews present status of the industry, describing deposits, and giving details of principal mines.

Mining and Smelting Copper Ore at Kalata (80901). F. W. Draper. Ills. 4500 w. Min & Sci Pr—Sept. 1, 1917. Ores are heavy sulphides. Methods described.

**Safety Lamps**

Ancient and Modern Construction of Miners' Safety Lamps (75237 A). W.

Best. 2500 w. Ir & Cl Trds Rev—Nov. 24, 1916. Reviews the history of various types.

Approved Safety Lamps (75895 A). Ills. 2500 w. Colly Gdn—Dec. 22, 1916. Order of Nov. 16, 1916.

Further Notes on Safety Lamps (77166 A). Simon Tate. From paper before North of Eng. Inst. of Min. & Mech. Engrs. 4000 w. Colly Gdn—Feb. 16, 1917. Reviews development of the Clanny, the Geordy, and the Davy lamps. Relative advantages.

**Sampling**

Sampling an Erratic Orebody (78923). L. A. Parsons, with editorial. 4500 w. Min & Sci Pr—May 26, 1917. Large number of small samples safer than a few large ones. Criticizes methods.

**Shafts**

Sinking the Wallenberg Shaft (74396). Lloyd D. Cooper. Ills. 1800 w. Eng & Min Jl—Nov. 4, 1916. Work in Norway.

Design for Auxiliary Shaft (75047) O. J. Pleschner. Ills. 600 w. Cl Age—Dec. 2, 1916. Details of design.

Pit Shaft Sinking by the Freezing Process (75236 A). Ills. 1100 w. Engr—Nov. 24, 1916. Various applications.

Widening the Upcast Shaft at Tinsley Park Colliery (75807 N). Plate. H. J. Atkinson, with discussion. 10 pp. Instn Min Engrs, Trans—Nov., 1916. Details.

Concreting the Sacramento Shaft at Bisbee (75827). Ills. 3500 w. West Eng—Jan., 1917. Methods and costs.

The Stresses in Cast Iron Tubbing Segments (75978 A). Ills. 800 w. Colly Gdn—Dec. 29, 1916. Imaginary example solved.

Making a Shaft Upwards (76892 N). George Blake Walker, with discussion. Ills. 2800 w. Instn Min Engrs, Trans—Jan., 1917. Brief description.

Temporary Sinking Layout and Design of Steel Shaft Lining at Lehigh, Mont. (76487). D. J. Jenkins. Ills. 900 w. Cl Age—Feb. 3, 1917. Details of plan adopted.

Shaft-Sinking by the Freezing Process (76889 N). Frederick Schmidt. Ills. & 2 Plates. 45 pp. Instn Min Engrs, Trans—Jan., 1917. Details of methods.

Enlarging the Chief Consolidated Shaft (80605). J. H. Hedges. Ills. 1700 w. Eng & Min Jl—Aug. 18, 1917. Enlarged from single and pipe compartment to double compartment pipe and manway. Methods described.

**Shaft-Signalling**

Shaft-Signalling Regulations with Special Reference to the Pearce-Hall Signal Indicator (81863 A). R. W. Hall. Read before Nat'l Assn. of Colly Mngrs. 2500 w. Ills. Ir & Cl Trds Rev—Sept. 28, 1917. General regulations as to signalling in shafts, with a description of a patent signalling device.

Bare-Wire Signalling Systems (77176 A). Ills. 3500 w. Ir & Cl Trds Rev—Feb. 16, 1917. Discussion by the Nat. Assn. of Col. Mgrs. Systems now in use described.

**Shaft Sinking**

Sinking Through Wet Strata at Great Depths (81696 A). H. Muller, in *Glückauf*. 3000 w. Colly Gdn—Sept. 14, 1917. Serial, 1st part. Methods of crossing water-bearing zones at depth of between 400 and 500 metres.

**Skip-Changing**

Skip Changing Devices at the Butte Mines (82109). Theodore Pilger. Ills. 2000 w. Min & Sci Pr—Oct. 27, 1917. New methods of transportation through shafts.

**Skips**

Automatic Skips in Shaft with Rope-Guides (79467). H. Vincent Wallace. Ills. 600 w. Min & Sci Pr—June 23, 1917. An inexpensive appliance that has stood the test of 250,000 trips without failure.

**Stope Contours**

Reduction of Stope Contours (75355). J. J. Bristol. Ills. 2500 w. Eng & Min Jl—Dec. 16, 1916. Present practice on the Rand, with a new reduction-cosine pantograph.

**Stope Filling**

Neutralization Effect of Ash on Acid-Sand in Stope Filling (76687 N). Chris. Toombs. 1800 w. C M M S S A, Jl—Nov., 1916. Results at the East Rand Proprietary Mines.

**Stoping**

Stoping in the Calumet and Arizona Mines, Bisbee, Ariz. (78727 D). 1500 w. A I M E, Bul—May, 1917. Discussion of the paper of Philip D. Wilson.

Stope Measurement at Messina (78692 N). William Whyte. Ills. 9 pp. Instn Min & Met, Bul 151—Apr. 12, 1917. Special methods used in this copper mine in the Transvaal.

Stoping Methods at the Franklin Mines (80909). H. H. Hodgkinson. Ills. 1200 w. Eng & Min Jl—Sept. 1, 1917. Shrinkage system described; mining methods in New Jersey zinc mine.

**Subsidence**

The Subsidence in the Alaska-Treadwell Mines (76669). Ills. 3500 w. Min & Sci Pr—Feb. 10, 1917. Causes.

**Survey Notes**

Filing Survey Data at Mines (76108). R. S. Schultz, Jr. 4200 w. Eng & Min

Jl—Jan. 20, 1917. Serial, 1st part. Efficient methods explained.

**Timbering**

Some Practical Notes on the Economical Use of Timber in Coal-Mines (79352 N). F. C. Lee. Ills. 12 pp. Instn Min Engrs, Trans—May, 1917. Suggestions for the saving of timber.

Timbering in Deep Placer Mining (80501). Harold T. Power. Ills. 2200 w. Min & Sci Pr—Aug. 11, 1917. Hidden Treasure mine durability of different woods; methods of framing and setting.

Notes on Tests of Timber Pig-Styes (81823 N). H. C. Hilton. Ills. 3500 w. So Af Instn Engrs, Jl—Aug., 1917. Uses of timber in the Transvaal gold mines. Tests made of types. Short discussion.

**Tin**

Bucket Dredging for Tin in the Federated Malay States (76045 A). Harry D. Griffiths. Ills. 6300 w. Min Mag—Dec., 1916. Serial, 1st part. Dredging operations, methods, conditions, etc.

Hydraulic Tin Mining in Swaziland (77270 A). J. Jervis Garrard. Plates & tables. 22 pp. Instn Min & Met, Bul 149—Feb. 5, 1917. Methods of working.

**Top-Slicing**

The Coronado Top-Slicing Method (77877). Peter B. Scotland. Ills. 600 w. Eng & Min Jl—April 7, 1917. Method developed at Metcalfe, Ariz.

**Tramming**

Underground Tramming (77881). David B. Scott. Ills. 3500 w. Eng & Min Jl—April 7, 1917. Résumé of types of ore cars used, types of mine locomotives, and comparative costs.

**Treadwell Mines**

Alaska Treadwell-Mexican-United Report (76109). 5000 w. Eng & Min Jl—Jan. 20, 1917. President's report.

**Tunnels**

Roosevelt Drainage Tunnel of the Cripple Creek District (75703). Ills. 1900 w. Eng News—Jan. 4, 1917. A mining-tunnel operation.

**Unwatering**

Unwatering Projects at Leadville (77626). Arthur J. Hoskin. Ills. 4000 w. Eng & Min Jl—March 24, 1917. Three projects to make available former producers. Method and equipment now proposed.

Unwatering an Inclined Shaft (77715). James E. Harding. Ills. 1500 w. Eng & Min Jl—March 31, 1917. Methods used in a shaft that had been under water 35 years.

**Utah**

Mining in Utah (80500). L. O. Howard. 1800 w. Min & Sci Pr—Aug. 11, 1917. Operations at various mines; labor adjustment, wage increase, etc.

Safety and Sociological Conditions in Utah (81781). R. M. Magraw. Ills. 2500 w. Cl Age—Oct. 13, 1917. Care taken to prevent dust explosions. Good houses with light, heat and water.

**Valuing**

Mill-Tests vs. Hand-Sampling in Valuing Mines (80190). Morton Webber. Ills. 5000 w. Min & Sci Pr—July 28, 1917. Two methods: type of ore body will determine course to pursue.

**Wharves**

Submarine Mine Wharf at Fort Armstrong, T. H. (74632 B). Charles J. Taylor. Ills. 2200 w. Prof Mem—Nov.-Dec., 1916. Reinforced-concrete pile wharf for use in submarine mine work.

**Winding**

New Winding Plant at Neumühl Colliery, Hamborn (75649 A). Ills. 2000 w. Colly Gdn—Dec. 15, 1916. Design and equipment.

Comparison of Ward-Leonard and Three-Phase Winding Systems (77456 N). S. E. T. Ewing, with discussion. 4000 w. S Af Inst of Elec Engrs, Trans—Dec., 1916. Compared as to economy, reliability, etc.

Recent Developments of the Whiting Hoist as Applied to Deep Winding (77665 N). B. Gray and J. Whitehouse. Ills. 11 pp. So Af Instn Engrs, Jl—Feb., 1917. Experiments and developments carried out in South Africa.

Some Notes of Efficiencies and Costs of Steam and Electric Winding Plant (77455 N). Harold W. Clayden. 1800 w. S Af Inst of Elec Engrs, Trans—Dec., 1916. Efficiencies and power costs of three winders.

Electric Winding for Mines (81891 A). W. R. Evans. Also editorial. Ills. 6000 w. Min Mag—Sept., 1917. Serial, 1st part. Outlines modern systems.

**Winding Engine**

An Atmospheric Colliery Winding Engine (80628 A). Ills. 1500 w. Engr—Aug. 3, 1917. Describes old engine and winding gear until recently in service at a mine belonging to the Madeley Wood Co.

**Yukon**

Gold Dredging in Yukon (74765). Ills. 7000 w. Can Min Jl—Nov. 15, 1916. Work of the different companies, dredge construction, methods, etc.

# MINES AND DISTRICTS

**Alaska**

The Yukon-Koyukuk Region, Alaska (74443 A). Henry M. Eakin. Ills. & Maps. 80 pp. U S Geol Surv—Bul. 631. Information based on recent exploration.

The Mining Industry in the Territory of Alaska During the Calendar Year 1915 (79334). Sumner S. Smith. 58 pp. U S Bur Mines—Bul 142. Report of the work.

Alaska's Mineral Supplies (79819 N). Alfred H. Brooks. 14 pp. U S Geol Surv—Bul 666-P. Available mineral reserves in special demand during the war.

**Arizona**

Geology and Ore Deposits of Mohave County, Arizona (74640 D). Frank C. Schrader. Ills. 32 pp. A I M E, Bul—Nov., 1916. Development of this region.

Gold, Silver, Copper, Lead, and Zinc in Arizona in 1915 (75378 N). C. V. Heikes, 36 pp. U S Geol Surv, I: 17—Dec. 9, 1916. Mines report.

Geology and Ore Deposits of Mohave County, Arizona (77439 D). Ills. 2000 w. A I M E, Bul—March, 1917. Discussion of Frank C. Schrader's paper.

Mining in Northwestern Arizona (78530). R. T. Mason. Map. 1800 w. Min & Sci Pr—May 5, 1917. Activity at various mines.

Geology and Ore Deposits of Mohave County, Arizona (78126 D). 1600 w. A I M E, Bul—April, 1917. Discussion of Frank C. Shrader's paper before Inst. Mining Engrs.

Miami, Arizona: The Discovery (80317). T. A. Rickard. Map, Plan, & Ills. 4200 w. Min & Sci Pr—Aug. 4, 1917. Serial, 1st part. On mining and metallurgical practice in this district. Outlines local geology.

**Australasia**

Mining in Australasia in 1916 (75768). W. P. Geary. 3500 w. Eng & Min Jl—Jan. 6, 1917. Reviews conditions during the year, production of various metals.

**Australia**

Mistake Wolfram Mine, Emuford (79299 N). E. Cecil Saint-Smith. 2500 w. Qnsd Gov Min Jl—May, 1917. Plan and description.

The Encouragement of Mining in Australia (80686 N). Hartwell Conder. 2500 w. Min & Eng Rev—July, 1917. Outlines a scientific prospecting scheme.

**Belle Isle, La.**

A Review of the Exploration of Belle Isle, Louisiana (81225 D). A. F. Lucas. Map. 2500 w. A I M E, Bul—Sept., 1917. Results of recent drilling of six wells on the island, and present knowledge of the geology. Salt, sulphur, petroleum and gas found.

**Bolivia**

The Mining Industry of Bolivia (75172). Joseph T. Singewald, Jr., and Benjamin LeRoy Miller. Ills. 5000 w. Eng & Min Jl—Dec. 9, 1916. General description; first silver, now tin the chief source of revenue.

The Huayni-Potosi Bismuth-Tin Mines of Bolivia (75857). Benjamin LeRoy Miller and Joseph T. Singewald, Jr. Ills. 2500 w. Eng & Min Jl—Dec. 16, 1916. Mines and methods, geology, etc.

Mining Conditions at Potosi, Bolivia (76621). Benjamin L. Miller, and Joseph T. Singewald, Jr. Ills. 5000 w. Eng & Min Jl—Feb. 10, 1917. Region formerly worked for silver, now producing tin ore.

New Developments in the Porco District, Bolivia (76868). Joseph T. Singewald, Jr., and Benjamin LeRoy Miller. Ills. 4000 w. Eng & Min Jl—Feb. 24, 1917. Formerly worked for silver, but at present for tin.

The Payña Tin-Mining District, Bolivia (79034). Francis Church Lincoln. Map. 1200 w. Min & Sci Pr—June 2, 1917. Mine locations; principal properties; geology; methods, etc.

**Brazil**

The Mining Industry of Brazil (77252). F. Lynwood Garrison. Ills. 4000 w. Min & Sci Pr—March 10, 1917. Facts regarding the mineral resources. Gold, iron, and diamonds.

**British Columbia**

A Journey to British Columbia (74421). T. A. Rickard. Ills. 6500 w. Min & Sci Pr—Nov. 4, 1916. Observations and impressions of a beautiful mining region.

The Blue Bell Mine, Riondel, B. C. (74963). T. A. Rickard. Ills. 1700 w. Min & Sci Pr—Nov. 25, 1916. Story of the oldest mine in the Kootenay region.

The Nickel Plate Mine and Mill (76152). T. A. Rickard. Ills. 4000 w. Min & Sci Pr—Jan. 20, 1917. Gold-bearing arseno-pyritic ore in limestone at Hedley, B. C., and its development.

Ymir Mining Camp, British Columbia (77962 N). Charles Wales Drysdale. Maps & Ills. 150 pp. Can Dept Mines—Mem. 94. History of this gold camp—one of the oldest lode mining camps in B. C.

Mining Activity in Northern British Columbia (81006). J. H. C. Gainfort. 1500 w. Can Min Jl—Sept. 1, 1917. Report of development and progress.

**California**

California Mineral Production (75058). 1500 w. Eng & Min Jl—Dec. 2, 1916. Value of production in 1915.

California Mineral Production for 1915 (76320 N). Walter W. Bradley. Maps.

180 pp. Calif State Min Bur, Bul. 71—Aug., 1916. With mining law appendix.

**Canada**

Mining Possibilities Along Canadian Northern Railway, West Shining Tree to Nipigon (74428). Cyril T. Young. 1200 w. Can Min Jl—Nov. 1, 1916.

Preliminary Report of the Mineral Production of Canada During the Calendar Year 1916 (77257 N). John McLeish. 20 pp. Can Dept Mines—No. 449.

The Production of Copper, Gold, Lead, Nickel, Silver, Zinc, and Other Metals in Canada During the Calendar Year 1915 (77260 N). 82 pp. Can Dept Mines—No. 425.

War Importance of Canada's Mineral Resources (77181). Arthur A. Cole. 2500 w. Eng & Min Jl—April 21, 1917. Reviews extent and organization of the Canadian industry.

Summary Report of the Geological Survey, Department of Mines, for the Calendar Year 1916 (81120 A). Ills. 407 pp. Can Dept Mines—No. 1684.

A New Canadian Mining District (81807). Walter Karri-Davies. Map. 1500 w. Min & Sci Pr—Oct. 13, 1917. Mandy mine and Flin Flon lake copper deposits; difficulties of exploration, etc.

**Ceylon Minerals**

Recent Work on Monazite and Other Thorium Minerals in Ceylon (76012 N). 45 pp. Imp Inst, Bul—July-Sept., 1916. Results of a mineral survey 1911-15.

**China**

China After the War (78580 A). 1200 w. Engr—Apr. 20, 1917. The mining and industrial promise.

**Colorado**

Gold, Silver, Copper, Lead, and Zinc in Colorado in 1915 (75377 N). Charles W. Henderson. 64 pp. U S Geol Surv, I: 16—Dec. 12, 1916. Mines report.

**Cripple Creek**

The Cresson Bonanzas, at Cripple Creek (81207). Horace B. Patton. Ills. 3500 w. Min & Sci Pr—Sept. 15, 1917. Account of the unusual occurrences of rich gold ore. A cavity lined with telluride ore.

**Dutch Indies**

De Mineralenrijkdom van Ned. Oost-Indie (80014 B). R. W. Van Der Veen. 5500 w. Ingr—June 2, 1917. Mineral resources of the Dutch East Indies.

**El Dorado**

El Dorado Canyon—Mining, Milling and Development (75358). W. A. Scott. Ills. 2500 w. Min & Eng Wld—Dec. 16, 1916. Geology, ore occurrence, and mines.

**Florida**

A Florida Rare-Mineral Deposit (80201). Donald M. Liddell. Ills. 1500 w. Eng & Min Jl—July 28, 1917. Ilmenite, zircon, rutile and monazite sand are found in a beach sand near Jacksonville, Fla.

**France**

Les Mines De Fer Francaises Et La Guerre (77609 B). A. Pawlowski. Ills. 2200 w. Location and extent of French iron deposits; methods of mining, etc.

**India**

The Mineral Production of India During 1915 (78226 N). H. H. Hayden. 50 pp. Geol Surv of India—Vol. 47, Part 3. Value, minerals, concessions.

**Ireland**

Mineral Resources of Ireland (81421). 1300 w. Times Eng Supp—Aug. 31, 1917. Distribution and estimated quantity of coal, iron and other minerals.

**Japan**

Mining in Japan in 1916 (75770). H. W. Paul. 2200 w. Eng & Min Jl—Jan. 6, 1917. Reviews the progress of the industry during the year.

**Jerome**

Jerome Mining District Geology (75176). Ills. 2500 w. Eng & Min Jl—Dec. 9, 1916. Rock characteristics and outcrops, faulting, etc.

**Kansas City**

The Economic Resources of the Kansas City Zone (79763 B). Arthur J. Boynton. 5000 w. Jl Ind & Eng Chem—July, 1917. Discussion of industries and resources and the remarkable economic development.

**Khartoum**

The Kitchener Molybdenite Mine, Khartoum (79298 N). E. Cecil Saint-Smith. Ills. 3800 w. Qnsd Gov Min Jl—May, 1917 Geology of the field and description of reefs of molybdenite-bearing quartz.

**Lake St. John**

Part of the District of Lake St. John, Quebec (77470 N). John A. Dresser. Ills. & Map. 72 pp. Can Dept Mines, Mem. 92—No. 1642. Region important for agricultural and forest products, water-powers, clay deposits, and iron ores.

**Manitoba**

The Mining Situation in Manitoba (76160 N). R. C. Wallace. 1500 w. Can Min Inst, Bul—Jan., 1917. Progress in various districts.

Manitoba as a Mining Province (79462). J. A. Campbell. Ills. 1500 w Eng & Min Jl—June 23, 1917. Recent developments in the Flin Flon and Herb Lake districts. Future of district promising.

Copper and Gold in Manitoba (79766). J. A. Campbell. 3800 w. Can Min Jl—July 1, 1917. Mines and mining operations, development, etc.

Through the Mineral Belt of Northern Manitoba (81004). 3000 w. Can Min Jl —Sept. 1, 1917. Some of the characteristics of the country and developments in progress.

**Mexico**

Conditions in Mexico (76153). Maps and Ill. 4500 w. Min & Sci Pr—Jan. 20, 1917. The Carranza decrees and their effects.

**Montana**

Gold, Silver, Copper, Lead and Zinc in Montana in 1915 (75277 N). V. C. Heikes. 35 pp. U S Geol Surv, I: 19—Dec. 9, 1916. Production by counties.

Mineral Prospects in Fergus County, Mont. (77979). O. W. Freeman. Ills. 2000 w. Eng & Min Jl—April 14, 1917. Deposits yielding gold, silver, lead, zinc, copper, coal, oil, sapphire, topaz, limestone and gypsum.

Ore Deposits of the Boulder Batholith of Montana (78144 D). Paul Billingsley, and J. A. Grimes. Ills. 77 pp. A I M E, Bul—April, 1917. A comparison, based on genesis, of the ore deposits associated with the igneous rocks of the central Montana Rockies.

**Nevada**

Mining in Nevada (75011). Al H. Martin. Map. 1800 w. Min & Sci Pr—Dec. 2, 1916. Review of mining activities in the important districts.

The White Caps Mine, Manhattan, Nevada (75390). John L. Dynan. Ills. 1200 w. Min & Sci Pr—Dec. 16, 1916. Deposits described.

Gold, Silver, Copper, Lead, and Zinc in Nevada in 1915 (75627 N). V. C. Heikes. 45 pp. U S Geol Surv, I : 20—Dec. 26, 1916. Mines report.

**New Mexico**

Gold, Silver, Copper, Lead, and Zinc in New Mexico and Texas in 1915 (74822 N). Charles W. Henderson. 25 pp. U S Geol Surv, I:14—Nov. 23, 1916. Production, value, etc.

**Northwestern Territory**

Northwestern Country Tributary to Spokane is a Great Mineral Producer (74719). J. E. Duff. Ills. 2500 w. Min & Eng Wld—Nov. 18, 1916. Coal and metal mines in this field.

**Norway**

The Pyrite Deposits Near Röros, Norway (80284 D). H. Ries and R. E. Somers. Ills. 15 pp. A I M E, Bul—Aug., 1917. A study of their origin.

**Ontario**

The Year in Ontario (76159 N). Thomas W. Gibson. 1700 w. Can Min Inst, Bul—Jan., 1917. Production and value.

Mineral Deposits Near Kingston, Ont. (77990). M. B. Baker. 3500 w. Can Min Jl—April 1, 1917. Extracts from report published by the Ontario Bureau of Mines. Great variety of economic minerals.

The Massey Copper Mine, Ontario, Canada (80328). Francis Church Lincoln. Ills. 1800 w. Eng & Min Jl—Aug. 4, 1917. Worked for flux for the Sudbury ores, now treated by flotation process.

Mineral Wealth Along the T. & N. O. Railway (81750). A. A. Cole. Ills. 2500 w. Can Min Jl—Oct. 1, 1917. Value of the silver, nickel, arsenic, etc., and mining opportunities.

**Ore Deposits**

Magmas and Sulphide Ores (81681 B). A. P. Coleman. 8 pp. Ec Geol—Aug., 1917. Study of their origin, favoring the theory of magmatic segregation under the influence of gravity.

Magmatic Ore Deposits, Ludbury, Ont. (81680 B). Alan M. Bateman. 35 pp. Ec Geol—Aug., 1917. Study of the origin advancing an hypothesis.

**Oregon**

The Mining Industry of Oregon (76729 A). H. N. Lowrie. 3500 w. Ore Soc Engrs—Jan., 1917. The Oregon Bureau of Mines and Geology and its work. Descriptive report.

**Ozark Region**

Geology and Mineral Deposits of the Ozark Region (81584 D). H. A. Buehler. Maps & cross sections. 20 pp. A I M E, Bul—Oct., 1917. Occupies parts of Missouri, Arkansas, Oklahoma, Kansas, and Illinois. Lead and zinc the chief mineral resources.

**Peru**

The Morococha and Casapalca Districts in Peru (74700). Joseph T. Singewald, Jr., and Benjamin Le Roy Miller. Ills. 4500 w. Eng & Min Jl—Nov. 18, 1916. Old mining districts becoming active producers under American control.

Ancient Workings Exposed (76930). 1000 w. Times Eng Supp—Jan. 26, 1917. Description of very old workings in the Andes at 16,000 feet elevation.

The Cerro De Pasco Mines, Peru (76871). 3000 w. Eng & Min Jl—Feb. 24, 1917. Brief review of the history and present condition.

The Mining Industry of Peru (79171). F. C. Fuchs. 5000 w. Eng & Min Jl—June 9, 1917. Account of mineral production during the last 13 years with description of distribution of valuable deposits.

Mining in Southern Peru (79638). Francis Church Lincoln. Ills. 2200 w. Eng & Min Jl—June 30, 1917. Mines and geology of Lake Titicaca region.

**Philippines**

The Mineral Resources of the Philippine Islands for the Year 1915 (77494 N). Map & Ills. 33 pp. Phil Bur Sci—1916. Papers by different authors, dealing with mining possibilities, mineral production, gold dredging, iron and salt industries, coal, etc.

**Prospecting**

Prospecting with Electricity (80807). H. R. Conklin. Ills. 1500 w. Eng & Min Jl—Aug. 25, 1917. New method of exploring ground supposed to be mineralized.

**Quarries**

The Chatsbury Slate Quarries, Australia (81839 A). From report by J. E. Carne and E. C. Andrews. Ills. 2000 w. Quarry—Oct., 1917. Account of work done.

**Quebec**

Report on Mining Operations in the Province of Quebec During the Year 1916 (81124 N). Maps & Ills. 162 pp. Dept Mines & Fisheries, Quebec—1917. Mineral resources.

**Queensland**

Kangaroo Hills Mineral Field, North Queensland (75461 N). E. Cecil Saint-Smith. Ills. 5000 w. Qnsd Gov Min Jl—Nov., 1916. Geological survey report.

**Rand**

The Far East Rand Mines (74724 N). E. M. Weston. 1500 w. Min & Eng Rev—Oct. 5, 1916. Mining leases; prospects of mines in the Rand Extension, etc.

Metallurgical Problems of the Rand (76801). H. Foster Bain. Also editorial. Ills. 8000 w. Min & Sci Pr—Feb. 17, 1917. Review of metallurgical practice, with comments.

The Development of the Far East Rand (77292 A). Ernest Williams. 2000 w. Min Mag—Feb., 1917. Details of proposed plan.

**Russia**

The Russian Crisis (80818). Charles Janin. Ills. 4000 w. Min & Sci Pr—Aug. 4, 1917. The beginning and causes of the revolution. Effect upon mining.

**Sarre Basin**

Le Bassin Houiller De La Sarre (80715 B). J. T. Laspière. Ills. 4500 w. Gen Civ—July 21, 1917. Coal and iron deposits in the Sarre Basin, province of Lorraine. Extent of deposits and production before the war.

**Siberia**

Le Bassin Minier De Kouznetzk (79430 B). J. Vichniak. Map. 2800 w. Description of the Kouznetzk Basin, Siberia. A district of rich deposits of iron ore but little developed.

**South America**

South America in 1916 (75771). 3000 w. Eng & Min Jl—Jan. 6, 1917. Reports from Chile, Bolivia, Peru and Ecuador, Colombia, Venezuela, Brazil and Argentine.

**Spain**

Les Mines De Pyrites Espagnoles (80750 B). L. De Launay. Ills. 4900 w. La Nat—Aug. 11, 1917. Occurrence and methods of mining of pyrites in Spain and Portugal.

**Tasmania**

The Gladstone Mineral District (78116 N). W. H. Twelvetrees. Map. 54 pp. Tasmania Dept Mines—Geol Surv Bul 25. Description of a field journey. General and economic geology; alluvial, lode and stone mining; gems, etc. Tin-mining the chief industry.

**Tin-Silver**

Oruro Tin-Silver District, Bolivia (79928). Map. 1200 w. Min & Sci Pr—July 14, 1917. Age of the Oruro mines; tin-silver vein type; geology, etc.

**Transvaal**

Transvaal Mining in 1916 (75769). H. F. Marriott. 2500 w. Eng & Min Jl—Jan. 6, 1917. Production, mills, labor, etc.

**United States**

General Review of Mining in the United States in 1916 (75767). 10500 w. Eng & Min Jl—Jan. 6, 1916. Review by states.

Mineral Production of the United States in 1915 (78225 N). Introduction. H. D. McCaskey. Summary. Martha D. Clark. 84 pp. U S Geol Surv, I:B—April 16, 1917.

**Utah**

Gold, Silver, Copper, Lead, and Zinc in Utah in 1915 (74770 N). V. C. Heikes. 35 pp. U S Geol Surv, I:15—Nov. 24, 1916. Production, metallurgical industry, etc.

Mining in Utah (76609). L. O. Howard. Map. 2500 w. Min & Sci Pr—Feb. 3, 1917. Summary of activity during the past year.

Deep Creek, Clifton Mining District, Utah (78918). A. E. Custer. Ills. 3300 w. Eng & Min Jl—May 26, 1917. Development of a highly mineralized section of the State.

**Washington**

Two Washington Mining Districts (74746). Robert B. Brinsmade. Map. 2000 w. Min & Sci Pr—Nov. 18, 1916. Details of the Metaline and Bald Mountain districts.

**Yukon**

Wheaton District, Southern Yukon (79093 N). D. D. Cairnes. Maps. 13 pp. Can Geol Surv, No. 1620. Survey and geological examination of this district.

**Zinc**

The New Zinc Mining District Near Edwards, N. Y. (74339 B). David H. Newland. Ills. 22 pp. Econ Geol—Oct.-Nov., 1916. Location, geology, distribution, form, composition, etc.

# MINOR MINERALS

**Aluminum**

Recent Industrial Uses of Aluminum (81430 N). F. G. Shull. 1200 w. A I Mt, Jl—June, 1917. Materials of commercial importance recently made from aluminum.

**Antimony**

Occurrence and Utilization of Antimony Ores (76014 N). 28 pp. Imp Inst, Bul—July-Sept., 1916. The minerals, their occurrence in different countries.

Mining of Antimony Ores in Canada (76850). A. W. G. Wilson. 2000 w. Can Min Jl—Feb. 15, 1917. Serial, 1st part. The mine at West Gore, Nova Scotia, is described in present article.

Antimony, Arsenic, Bismuth, Selenium, and Tellurium in 1915 (77463 N). Frank L. Hess. 14 pp. U S Geol Surv, I:27—March 13, 1917. Production, imports, etc.

Antimony Deposits of Arkansas (79672). Ellsworth H. Shriver. Ills. 1500 w. Min & Sci Pr—June 30, 1917. History, geology, outcrops and development of Sevier County mines.

Antimony, Its Metallurgy and Uses (81431 N). K. C. Li. Ills. 20 pp. A I Mt, Jl—June, 1917. Production, reduction, refining, uses, etc.

The Electrolytic Production of Antimony Direct from Stibnite Ore (81429 N). D. J. Demorest. 1500 w. A I Mt, Jl—June, 1917. Results of some recent experiments.

Metallurgy of Antimony (81937 B). K. C. Li. Ills. 4500 w. Eng & Min Jl—Oct. 20, 1917. (Special No.) Excerpt from paper read before the Am. Inst. of Metals, with additional illustrations and descriptions. Review of development.

**Asbestos**

The Genesis of Asbestos and Asbestiform Minerals (74642 D). Stephen Taber. Ills. 25 pp. A I M E, Bul—Nov., 1916. Properties, types, origin of fibrous structure, etc.

The Genesis of Asbestos and Asbestiform Minerals (77442 D). Ills. 3500 w. A I M E, Bul—March, 1917. Discussion of Stephen Taber's paper.

The Genesis of Asbestos and Asbestiform Minerals (78724 D). 1000 w. A I M E, Bul—May, 1917. Author's reply to discussion of the paper of Stephen Taber on asbestos minerals.

Our Mineral Supplies — Asbestos (78681). J. S. Diller. 1200 w. U S Geol Surv—Bul 666-H. Production and prices.

Blue Asbestos (79593 A). 1400 w. Engr—June 8, 1917. Abstract from report of the Government Mining Engineer, South Africa, for the year 1915. Information concerning the comparative values of white and blue asbestos, and the uses.

Asbestos in 1916 (80464). J. S. Diller. 3000 w. U S Geol Surv, II: 4—July 21, 1917. Review of the industry in the United States.

**Barytes**

Barytes Mining in Georgia (75441). Arthur C. Vivian. Ills. 1200 w. Eng & Min Jl—Dec. 23, 1916. Seven mines are being worked and others equipped.

**Bauxite**

Sur L'Emploi De La Bauxite Comme Matière Réfractaire (77568 C + D). L. Le Chatelier. 1800 w. Rev Met—Sept.-Oct., 1916. Report of investigations hitherto unpublished on use of bauxite as a refractory in steel works, etc. Suggestion made many years ago.

A Report on the Bauxite and Fullers Earth of the Coastal Plain of Georgia (80436 N). H. K. Shearer. Ills. 332 pp. Geol Surv of Ga—Bul. 31. Topographical and geologic features; deposits, characteristics, etc.

**Borax**

Borax in 1915 (75439 N). Charles G. Gale. Map. 400 w. U S Gov Surv, II:32—Dec. 18, 1916. Production and sources.

**Cadmium**

Metallurgy of Cadmium—Raw Materials, Technique and Economics (76449 A). Franz Juretzka. Trans. from *Metall und Erz*. 2000 w. Met & Chem Eng—Feb. 1, 1917. Methods of recovery.

**California**

Secondary Economic Minerals of California (77253). Herbert Lang. 1500 w. Min & Sci Pr—March 10, 1917. Of interest to producers of industrial non-metallic minerals.

**Carnotites**

The Radium-Uranium Ratio in Carnotites (76288). S. C. Lind and C. F. Whittemore. Ills. 25 pp. U S Bur Mines—Tech paper 88. Results of experiments. Methods used.

**Chile**

"Caliche" Deposits of Atacama Desert, Chile (79270). Fred MacCoy. Ills. 1500 w. Eng & Min Jl—June 16, 1917. Some of the soluble and insoluble salts occurring in the nitrate deposits.

**Clay**

Clay Deposits Near Mountain Glen, Union County, Illinois (77960 N). Stuart St. Clair. Ills. 13 pp. Ill State Geol Surv—Extract from Bul. No. 36. The deposits and their development.

**Clay Industries**

The Development of the Ceramic Industries in the United States (76629 B). A. V. Bleininger. Ills. 40 pp. Fkn Inst, Jl—Feb., 1917. Comprehensive historical review.

**Clays**

Refining and Utilization of Georgia Kaolins (76786). Ira E. Sprout. Ills. 45 pp. U S Bur Mines—Bul. 128. Methods of refining certain American clays.

Clays and Clay Products of Canada (77364 N). J. Keele. 2200 w. Can Min Inst, Bul—March, 1917. Brick tile, sewer pipe, terra cotta, pottery, etc. Raw materials and clay working industries.

Tests on Clay Materials Available in Illinois Coal Mines (77358 N). R. T. Stull and R. K. Hursh. Ills. 120 pp. Ill Geol Surv—Bul. 18. Investigations.

**Cobalt**

Occurrence and Utilization of Cobalt Ores (76015 N). 20 pp. Imp Inst, Bul—July-Sept., 1916. Distribution, uses, etc.

**Feldspar**

Feldspar in Canada (76833 N). Hugh S. de Schmid. Ills. & Maps. 116 pp. Can Dept Mines—No. 401. Reviews the Can. feldspar mining industry, and characteristics of feldspars, uses, etc.

**Ferro-chromium**

Metallurgy of Ferro-chromium (80483). Robert J. Anderson, in *Ir. Trd. Rev.* 2500 w. Eng & Min Jl—Aug. 11, 1917. Manufacture and use of this alloy.

**Ferro-Uranium**

Preparation of Ferro-Uranium (80439). H. W. Gillett and E. L. Mack. 40 pp. U S Bur Mines—Tech paper 177. Uses; possibilities of uranium steel; tests, etc.

**Fertilizers**

Fertilizers and Their Supply in War Time (77908 A). John Augustus Voelcker, with discussion. 12000 w. Roy Soc Arts, Jl—March 16, 1917. The present conditions of supply in Great Britain, the needs and how to provide.

American Smelting and Refining Company's Tests with Sulphur and Sulphuric Acid on Soils (80994). P. J. O'Gara. Ills. 2800 w. Mfrs' Rec—Sept. 6, 1917. Experiments to determine its value.

**Germanium**

The Occurrence of Germanium in Missouri and Wisconsin Blendes (79757 B). G. H. Buchanan. 2000 w. Jl Ind & Eng Chem—July, 1917. Discusses nature of rich germanium-bearing material.

**Graphite**

Clay County Graphite District of Alabama (78179). Irving Herr. Ills. 4000 w. Eng & Min Jl—April 21, 1917. Suggestions for improving the treatment of low-grade graphite.

Graphite (81210). L. W. Brooks. 4500 w. Min & Sci Pr—Sept. 15, 1917. Review of the technology of this mineral. Production, distribution and uses, and present demand.

**Gravel**

Gravel Deposits: Their Origin and Economic Development (78695). William Artingstall, Ills. 2200 w. Eng & Con—May 16, 1917. Geological study.

**Gypsum**

Gypsum in the Southern Part of the Bighorn Mountains, Wyoming (75246 N). Ills. 18 pp. U S Geol Surv, Bul 640-H —Nov. 29, 1916. Geography, geology, etc.

**Hydrocarbons**

The Cracking of Paraffin Base Oils (74326 A). Gustav Egloff, Thomas Twomey, and Robert J. Moore. 3300 w. Met & Chem Eng—Nov. 1, 1916. Time factor and temperature factor under pressure.

**Illinois Oil**

Preliminary Oil Report on Southern Illinois (74337 N). Albert D. Brokaw. Ills. 2000 w. Univ Ill—Extract from Bul. 35. Parts of Saline, Williamson, Pope and Johnson Counties.

**Laterite**

Laterite: Its Origin, Structure, and Minerals (81128 A). J. Morrow Campbell. 7500 w. Min Mag—Aug., 1917. Serial, 1st part. Information based on a close study covering many years, under favorable conditions.

**Magnesite**

A Sedimentary Magnesite Deposit (75051). Leroy A. Palmer. Ills. 1200 w. Eng & Min Jl—Dec. 2, 1916. Near Bissell, Calif.

Magnesite in 1915 (76317 N). Charles G. Yale. 8 pp. U S Geol Surv, II: 23—Dec. 19, 1916. Production, developments, prices and utilization.

The Origin and Geo-Chemistry of Magnesite (76802). S. H. Dolbear. Ills. 1800 w. Min & Sci Pr—Feb. 17, 1917. Sources.

Magnesite on the Pacific Coast (80504). Ills. 1500 w. Min & Sci Pr—Aug. 11, 1917. Operations at Porterville, Cal., and other places.

Magnesite Deposits of Grenville District, Argenteuil County, Quebec (81123 N). M. E. Wilson. Map & Ills. 63 pp.

Can Dept Mines—Mem. 98. General geology, deposits, etc.

**Manganese**

Manganese Ores of Russia, India, Brazil and Chile (75261 D). 2000 w. A I M E, Bul—Dec., 1916. Discussion of E. C. Harder's paper.

Manganese Ores of Russia, India, Brazil and Chile (78125 D). 1000 w. A I M E, Bul—April, 1917. Discussion of E. C. Harder's paper.

The Manganese Ores of the Lafayette District Minas Geraes, Brazil (78124 D). 2500 w. A I M E, Bul—April, 1917. Discussion of paper of Joseph T. Singewald, Jr. and Benjamin Leroy Miller.

Manganese Deposits of the Caddo Gap and De Queen Quadrangles, Arkansas (81322 N). Hugh D. Miser. Ills. 63 pp. U S Geol Surv, 660-C—Sept. 12, 1917. History, geography, geology, deposits, mines and prospects.

Manganese Deposits in Costa Rica (82085). Allen Murray Yonge. Ills. 1500 w. Eng & Min Jl—Oct. 27, 1917. Recent development on west coast.

Manganese in the Dakota Sandstone of Central Kansas (81683 B). W. A. Whitaker and W. H. Twenhofel. 700 w. Ec Geol—Aug., 1917. Examples illustrating how the manganese accumulated.

**Mercury**

An Apparatus for the Purification of Mercury (79086 B). Harrison E. Patten and Gerald H. Mains. 2000 w. Jl Ind & Eng Chem—June, 1917. Describes a mercury purifier.

**Minerals**

Our Mineral Supplies — Sulphur (78101). Philip S. Smith. 1200 w. U S Geol Surv—Bul. 666-B. Uses, sources, etc.

Our Mineral Supplies.—Chronite (78100). J. S. Diller. 1800 w. U S Geol Surv—Bul. 666-A. Uses, sources of supply, cost, etc.

Our Mineral Supplies—Manganese (78229). D. F. Hewett. 12 pp. U S Geol Surv—Bul 666-C. Problem of adequate supply.

Our Mineral Supplies—Platinum (78230). James M. Hill. 1200 w. U S Geol Surv—Bul 666-D. Uses, supply, position of United States.

Our Mineral Supplies—Sand and Gravel (78679). R. W. Stone. 1000 w. U S Geol Surv—Bul 666-G. Resources of United States.

Our Mineral Supplies—Salt, Bromine, and Calcium Chloride (78680). R. W. Stone. 1200 w. U S Geol Surv—Bul 666-F. Production in United States.

Our Mineral Supplies—Talc and Soapstone (78682). J. S. Diller. 500 w. U S Geol Surv—Bul 666-1.

What is a Metalliferous Mineral? (79927). L. O. Howard. 1800 w. Min & Sci Pr—July 14, 1917. Ruling of Commissioner of General Land Office on carnotite ore.

The Mineral Industry—1892-1916 (81310 A). G. A. Roush. 5000 w. Met & Chem Eng—Sept. 15, 1917. Review of increase in production, and discussion of future developments.

**Molybdenite**

A Note on the Wood Molybdenite Mine Near Quyon, Quebec (77365 N). John A. Dresser. 800 w. Can Min Inst, Bul—March, 1917. On Ottawa River. Development and outlook.

Molybdenum Ores and Their Concentration (76979). F. W. Horton. Ills. 1500 w. Min & Sci Pr—Feb. 24, 1917. Occurrence and concentration.

Concentrating Canadian Molybdenite (78537). H. H. Claudet. Abstract of paper read before Can. Min. Inst. 2500 w. Eng & Min Jl—May 5, 1917. A film-flotation mill and some characteristic results obtained.

Molybdenite Deposits of Ontario (79136). A. L. Parsons. 2500 w. Can Min Jl—June 1, 1917. Preliminary report of known occurrences of this ore in the Dominion.

The Concentration of Molybdenite Ores (79765). H. E. T. Haultain, F. C. Dyer, J. T. King, Ills. 1500 w. Can Min Jl—July 1, 1917. Notes by the staff of the Dept. of Min. Engng. of the Univ. of Toronto.

Molybdenite and Its Occurrences (80806). Sydney H. Ball. 5700 w. Eng & Min Jl—Aug. 25, 1917. The occurrences and geology of molybdenite deposits throughout the world. Its value as a war material.

Molybdenite Mining in New South Wales (80687 N). Ills. 2500 w. Min & Eng Rev—July, 1917. The Glen Innes and Deepwater districts.

Notes on Some Molybdenite Mines at Khartoum, North Queensland (80623 N). E. C. Saint-Smith. 7000 w. Queens Gov Min Jl—July 14, 1917. Information based on a hurried inspection.

**Molybdenum**

A Treatise on Molybdenum (74606 N). Herman Fleck. 5500 w. Col Sl Min Qt—July, 1916. History, properties, occurrence, geology, metallurgical treatment, uses, etc.

Molybdenum; Its Ores and Their Concentration, with a Discussion of Markets, Prices, and Uses (76157 A). Frederick

W. Horton. Ills. 120 pp. U S Bur Mines—Bul 111.

Molybdenum in the Hualpai Mountains (78778). L. Webster Wickes. 1500 w. Min & Sci Pr—May 19, 1917. A rare metal zone in Arizona. Geology.

Molybdenum and Ferro-Molybdenum (81180 A). 2200 w. Engng—Aug. 31, 1917. Information concerning this metal and its uses.

**Natural Brines**

Note on Appalachian Oil-Field Brines (77281 B). G. B. Richardson. 800 w. Econ Geol—Jan., 1917. Analyses of deep-well waters which are strongly saline.

**Natural Gas**

The Ratio of the Specific Heats and the Coefficient of Viscosity of Natural Gas from Typical Fields (74322 A). Robert F. Earhart. Abstract. 1200 w. A S M E, Jl—Nov., 1916. A study.

**Nickel**

The Nickel Deposits and Industry of Ontario (81362 A). 3500 w. Engr—Sept. 7, 1917. Serial, 1st part. Uses of nickel, its importance as a war material, the deposits, the attitude of the British Government toward Ontario nickel, etc.

**Nitrates**

The Chilean Nitrate Industry (76491). A. W. Allen. Ills. 2500 w. Eng & Min Jl—Feb. 3, 1917. Information regarding the extraction of nitrate from "caliche."

Nitrate Industry in Chile (76985 A). I. Berkwood Hobsbawn. 7500 w. Met & Chem Eng—March 1, 1917. Information from the latest report to the Chilean Government. Deposits, refining methods, etc.

German Sources of Nitrates (79433). 2000 w. Times Eng Supp—May 25, 1917. The oxidation of ammonia. Dependence of British industry upon imported nitrates.

Nitrates (80466). Hoyt S. Gale. 1500 w. U S Geol Surv—Bul 666-L. Supply, uses, and processes.

The Nitrate Supply Committee's Final Recommendations (81307 A). 3500 w. Met & Chem Eng—Sept. 15, 1917. Editorial review of principal features of the recommendations.

**Nitrogen**

Ammonium Nitrate From Coal Gas (81416). 2000 w. Times Eng Supp—Aug. 31, 1917. The Kilburn Scott electrical process for producing nitrogen.

**Oil Production**

The Influence of the Movement in Shales on the Area of Oil Production (74641 D). Richard A. Conkling. Ills. 600 w. A I M E, Bul—Nov., 1916. Studies the effect upon the producing area of different sands.

The Norfolk Oil Shales (74504 A). William Forbes-Leslie. (Abstract.) Also editorial. 3500 w. Engr—Oct. 20, 1916. Geology of the English shale-fields.

The Oil Shales of Norfolk (74895). 1400 w. Times Eng Supp—Oct. 27, 1916. Account of newly discovered beds, from paper before British Petroleum Technologists.

**Petroleum**

Tesis que para su examen profesional de ingenerio civil (74870 N). J. D. Lavin. Ills. 58 pp. Bol Pet—Oct., 1916. Thesis giving a comprehensive review of methods of obtaining, transporting and refining petroleum.

**Phosphate**

The Conservation of Phosphate Rock in the United States (74639 D). W. C. Phalen. Ills. 33 pp. A I M E, Bul—Nov., 1916. Describes methods of production and conservation in Tennessee.

The Garrison and Philipsburg Phosphate Fields, Montana (76326 N). J. T. Pardee. Maps. 32 pp. U S Geol Surv, Bul 640-K—Jan. 20, 1917. Investigations.

Phosphate Deposits of Western United States and Canada (78789). W. F. Ferrier. 1500 w. Can Min Jl—May 15, 1917. Account of field work.

Our Mineral Supplies—Phosphate Rock (78678). R. W. Stone. 1000 w. U S Geol Surv—Bul 666-J. The deposits in the United States.

La Crise Des Engrais (80054 B). P. Sallior. 1800 w. La Nat—July 14, 1917. Possible sources of phosphates in various countries.

Phosphate Deposits of Idaho (80606). Robert N. Bell. 2500 w. Eng & Min Jl—Aug. 18, 1917. Account of deposits in Park City formations in southeastern Idaho. Will yield an enormous tonnage of rock phosphate.

**Potash**

Development of Our Potash Industry (74325 A). F. M. de Beers. Address in Cincinnati. 2500 w. Met & Chem Eng—Nov. 1, 1916. When raw potash salts may be secured, and what has been accomplished.

Potash-Bearing Minerals of California (74422). Herbert Lang. 2000 w. Min & Sci Pr—Nov. 4, 1916. Sources are feldspar, alunite, leucite, seaweed, and the brine of dry lakes.

Potash Becomes a Valuable Cement-Mill Byproduct (75500). Arthur C. Hewitt. Ills. 4200 w. Eng News—Dec. 28, 1916. Dust precipitation plant at Hagerstown, Md.

The Carbonization of Kelp for the Recovery of Potash (76722 A). J. W. Turrentine. 2000 w. Met & Chem Eng—Feb. 15, 1917. Problems and solution.

The Volatilization of Potash from Cement Materials (77147 B). E. Anderson and R. J. Nestell. Ills. 4500 w. Jl Ind & Eng Chem—March, 1917. Experimental data and conclusions.

Potash as a Byproduct from the Blast Furnace (78137 D). 4000 w. A I M E, Bul—April, 1917. Discussion of R. J. Wysor's paper.

Pumping Potash from Nebraska Lakes (78534). R. P. Crawford. Ills. 700 w. Eng & Min Jl—May 5, 1917. An important potash-producing district.

Potash and a World Emergency (79382 A). W. C. Ebaugh. 13 pp. Utah Soc Engrs, Jl—May, 1917. Sources of potash, the need of independence of the United States from a foreign source, and what has been accomplished to secure it for future use.

Potash from Cement at the Riverside Portland Cement Company (79244 A). Ills. 1500 w. Met & Chem Eng—June 15, 1917. Data on the process of potash recovery.

The Recovery of Potash From Beet Sugar House Waste Liquors (79645 A). H. E. Zitkowski. 3000 w. Met & Chem Eng—July 1, 1917. Read before Am. Inst. of Chem. Engrs. Possibilities of this source of potash.

The Recovery of Potash from Beet Sugar House Waste Liquors (79760 B). H. E. Zitkowski. 2500 w. Jl Ind & Eng Chem—July, 1917. Uses of waste liquors; progress in recoveries, processes, etc.

Notes on Possibility of Manufacturing Potash Salts in Canada (79846 N). W. L. Dick. 1200 w. Can Min Inst, Bul—July, 1917. The work done in the United States, and the possibilities in Canada.

Discussion on Potash Recovery (81367 N). 5500 w. A I C E, Pro—Aug., 1917. Discussion at Buffalo meeting, June, 1917, on papers read before the Am. Inst. of Chem. Engrs.

Potash in 1916 (81341 N). Hoyt S. Gale. 98 pp. U S Geol Surv, II:9—Sept. 10, 1917. Distribution, uses, etc.

The Potash Industry of Canada (81366 N). E. B. Bigger. 1500 w. A I C E, Pro—Aug., 1917. Brief account of the past and present state of this industry.

What We Are Doing Toward Remedying the Potash Shortage (81241). Richard K. Meade. 3500 w. Mfrs' Rec—Sept. 20, 1917. Sources of potash developed since the war, the production, etc.

Potash Exploration (81684). 2000 w. Min & Sci Pr—Oct. 6, 1917. Full text of the act authorizing exploration for potassium on public lands.

The Recovery of Potash as a By-Product in the Manufacture of Portland Cement (81760). John J. Porter. 4000 w. Mfrs' Rec—Oct. 11, 1917. Experience and experiments described.

See also same heading under CIVIL ENGINEERING, *Materials of Construction*.

**Potassium**

A Method of Ashing Organic Materials for the Determination of Potassium (80277 B). P. L. Blumenthal, A. M. Peter, D. J. Healy and E. J. Gott. 3000 w. Jl Ind & Eng Chem—Aug., 1917. First of a series of investigations.

A New Method for the Recovery of Salts of Potassium and Aluminum from Mineral Silicates (81365 N). J. C. W. Frazer, W. W. Holland & E. Miller. 1500 w. A I C E, Pro—Aug., 1917. Report of experimental research.

**Production**

Cobalt, Molybdenum, Tin, Titanium, Tungsten, Radium, Uranium, and Vanadium in 1915 (77547 N). Frank L. Hess. 32 pp. U S Geol Surv, I:26—March 22, 1917. Production and imports.

**Pyrites**

Determination of the Explosibility of Pyrite as Well as Its Available Sulfur and the Sulfur Content of Its Cinders (80279 B). 3000 w. Jl Ind & Eng Chem—Aug., 1917. Details of proposed method.

**Refractories**

The Users' Point of View (79438). 2000 w. Times Eng Supp—May 25, 1917. Abstracts of papers before the Ceramic Society by W. J. Brooke, G. H. Timmis and C. W. Thomas. Valuable suggestions based on British experience.

**Salt**

The Production of Salt in Szechuen Province, Western China (75786 A). H. K. Richardson. Ills. 4000 w. Met & Chem Eng—Jan. 1, 1917. Methods used.

The Removal of Barium from Brines Used in the Manufacture of Salt (75860 B). W. W. Skinner and W. F. Baughman. 8500 w. Jl Ind & Eng Chem—Jan., 1916. Investigation of brines of the Ohio Valley; method of treatment, results, etc.

Salt Manufacture by Solar Evaporation of Sea Water (77351 A). Leroy A. Palmer. Ills. 1800 w. Met & Chem Eng—March 15, 1917. Operations in Southern California.

**Silica**

Accurate Silica Determination in Commercial Analysis (77717). F. G. Hawley. 2500 w. Eng & Min Jl—March 31, 1917. Results under varying conditions.

The Amorphous Silica of Southern Illinois (79639). E. A. Holbrook. Ills. 3000

w. Eng & Min Jl—June 30, 1917. Methods of mining, preparation for market, and grades produced.

**Statistics**

Our Mineral Statistics (78576 A). 2500 w. Engr—Apr. 13, 1917. Reviews report on the "Output of the Mines and Quarries."

**Sulphur**

The Sulphur Deposits in Culberson County, Texas (81226 D). William B. Phillips. 7000 w. A I M E, Bul—Sept., 1917. Location and geology of the sulphur districts, nature and origin of the deposits, etc.

**Talc**

Growth of the Talc Industry (79779). Freeland Jewett. Ills. 1200 w. Eng & Min Jl—July 7, 1917. Brief history of the industry.

Talc and Soapstone (80141 N). J. S. Diller. 1200 w. U S Geol Surv, II: 5—July 21, 1917. Production and uses.

**Thorium**

Thorium Minerals in 1916 (81321 N). Waldemar T. Schaller. 15 pp. U S Geol Surv, II:14—Sept. 13, 1917. Condition of industry, production and imports, localities, etc., with bibliography.

**Titanium**

Distribution and Uses of Titanium Ores (81393 D). 5200 w. Bul Imp Inst—Jan.-Mar., 1917. Review of principal localities where ores of this metal are found, and most recent applications of it as an alloy.

The Metallurgy of Titanium (81700 B). Robert J. Anderson. Ills. 38 pp. Fkn Inst, Jl—Oct., 1917. Serial, 1st part. The chemistry, geology, mineralogy, uses, etc.

**Tungsten**

Tungsten Deposits of Northwestern Inyo County, California (76557 N). Adolph Knopf. Map. 20 pp. U S Geol Surv, Bul 640-L—Jan. 26, 1917. Deposits and their development.

The Most Valuable Mine of To-day (76738 A). George D. Abraham. Ills. 1500 w. Autocar—Jan. 27, 1917. Workings in the Cumberland Mts., which form the only pure wolfram mine in the United Kingdom.

Tungsten Ores (80575 A). 3000 w. Engng—Aug. 3, 1917. Information concerning these ores, the deposits known, etc.

The Tungsten Deposits of Essexvale Southern Rhodesia (81165 A). 2000 w. Roy Soc Arts, Jl—Aug. 31, 1917. History, geology, deposits, etc.

See same heading under *Ore Dressing and Concentration*.

**Wolfram**

The Wolfram Deposits of Burma (81127 A). Harry D. Griffiths. Map. 5500 w. Min Mag—Aug., 1917. Serial, 1st part. Supplementary information to an article published in 1914, and discusses the labor problem, depth of lodes, etc.

## OIL AND GAS

**Anticlines**

Anticlines in Central Wyoming (75425 N). C. J. Hares. Ills. 45 pp. U S Geol Surv, Bul. 641-I—Dec. 16, 1916. Examination to determine whether region was favorable for accumulation of oil and gas.

**Benzol**

Benzol Recovery at Gasworks (77916 A). Ills. 2500 w. Engr—March 16, 1917. Details of plants for the recovery of benzene and toluene, used in high explosive shells.

The Rectification of Benzol (78235 N). W. Newton Drew, with discussion. Ills. 4500 w. Instn Min Engrs, Trans—March, 1917. Details of this industry and uses of the products.

**Bituminous Materials**

Studies in the Production of Oils and Tars from Bituminous Materials (81737 N). John Charavelle Ingram. Ills. 60 pp. Sch of Mines & Met, Univ of Mo, Bul—May, 1917. Investigations of the effects of heating of certain cannel coals; yields of oil, gas, ammonia and residue; composition of the oil, etc.

**Bituminous Shale**

The Bituminous-Shale Industry in Northwestern Colorado (75173). G. R. De Beque. Ills. 1000 w. Eng & Min Jl—Dec. 9, 1916. Area about 20 x 50 miles in extent. Yield per ton given.

**Coal Gas**

The Application of Coal Gas to Industry in War Time: Its National Importance (78560 A). Horace M. Thornton, with discussion. Ills. 10500 w. Roy Soc Arts, Jl—Apr. 20, 1917. Progress made in uses of the gas furnace.

**Cracking**

La Pyrogénation Des Hydrocarbures (78253 B). M. Desmarets. Ills. 6000 w. Rev Gen Sci—Feb. 28, 1917. Cracking process for obtaining benzene and toluene from heavy oil.

The Cracking of Petroleum in the Liquid Phase (78999 A). Roy Cross. Read before Am. Chem. Soc. 2000 w. Met & Chem Eng—June 1, 1917. The advantages and disadvantages of this process.

**Cuban Oil**

El Petroleo En La Region De Bacuranao (82009 A). J. Brödermann. Ills. 11000 w. Soc Cub Ing Rev—Sept., 1917. Location and development of the oil fields of Cuba.

**Cutting Oils**

Cutting Oils (79647 A). C. W. Copeland. 9000 w. Met & Chem Eng—July 1, 1917. Their properties, composition, examination, and industrial application.

**Deposits**

The Diastrophic Theory (78729 D). 8500 w. A I M E, Bul—May, 1917. Author's reply to discussion of the paper of Marcel R. Daly.

**Fuel Oils**

Liquid Fuels for Heating Furnaces (77071 A). George P. Pearce. 1800 w. Machy—March, 1917. Fixing values of fuel oils on a b.t.u. basis.

**Fuller's Earth**

Fuller's Earth and Its Valuation for the Oil Industry (79085 B. Theodore G. Richert. 1400 w. Jl Ind & Eng Chem—June, 1917. Essential points in the use of fuller's earth, with tests of its bleaching power, etc.

**Gas**

Sulla Distillazione Del Legno Per Produre Il Gas (81381 B). 1200 w. Ind—Aug. 21, 1917. Distillation of wood for making gas as practiced in various parts of Europe.

**Gas and Oil**

Reservoir Gas and Oil in the Vicinity of Cleveland, Ohio (76193 D). Frank R. Van Horn. Ills. 3500 w. A I M E, Bul—Jan., 1917. History, developments, etc.

**Gas Fields**

Granite in Kansas Wells (80287 D). Park Wright. 7 pp. A I M E, Bul—Aug., 1917. A theory accounting for the presence of the granite and conclusions of aid in determining the oil and gas value of the area.

**Gasholders**

See same heading under CIVIL ENGINEERING, *Construction.*

**Gasoline**

Gasoline from Natural Gas (74358). Bernard N. Glick. 3500 w. Auto—Nov. 2, 1916. Serial, 1st part. Information concerning production and treatment.

The Effect of Temperature and the Time Factor in the Formation of Gasoline in the Gas Phase at Constant Pressure (75109 B). Gustav Egloff, Thomas J. Twomey, and Robert J. Moore. 1800 w. Jl Ind & Eng Chem—Dec., 1916. Experimental investigations.

Physical and Chemical Properties of Gasolines Sold Throughout the United States During the Calendar Year 1915 (76001). W. F. Rittman, W. A. Jacobs and E. W. Dean. 35 pp. U S Bur Mines—Tech paper 163. Results of investigation.

One Billion Gallons of Synthetic Gasoline in 1916 (78651 A). Walter F. Rittman. 1800 w. Met & Chem Eng—May 15, 1917. Read before Am. Chem. Soc. Value of synthetic gasoline produced by cracking.

Report on the Price of Gasoline in 1915 (78386 N). Map & Diagrams. 224 pp. Gov Print Office—April 11, 1917. Report of the Federal Trade Commission.

Remedies for the Petroleum and Gasoline Situation (80329). Frederick G. Clapp. 5500 w. Eng & Min Jl—Aug. 4, 1917. The existing situation, its dangers and remedies.

The Supply of Gasoline (81685). Milton A. Allen. 1500 w. Min & Sci Pr—Oct. 6, 1917. Oils capable of yielding gasoline by cracking; the Scotch process adaptable to American conditions.

Synthetic Gasoline by Electro-chemical Means (81990 N). Louis Bond Cherry. Ills. 19 pp. Am Elec Chem Soc—Oct., 1917. Account of experiments. Possibilities of the process.

**Gas Pools**

The Southern Extremity of the "Clinton" Gas Pools in Ohio (79154 D). L. S. Panyity. Maps. 1000 w. A I M E, Bul—June, 1917. Analysis of the Richland Township development.

**Heat Value**

La Détermination Du Pouvoir Calorifique Du Gaz (80721 C + D). Tables. 4700 w. Pont Chaus Ann—Mar.-April, 1917. Instructions for determining thermal value of gas, as employed by the Lighting Department, City of Paris. Apparatus and standards.

**Hydrocarbon Deposits**

Geosynclines and Petroliferous Deposits (80289 D). Marcel Daly. Maps. 12 pp. A I M E, Bul—Aug., 1917. Study of the relations between earth movements and hydrocarbon accumulations.

**Hydrocarbons**

The Pyrogenesis of Hydrocarbons (75234 A). 2000 w. Engng—Nov. 24, 1916. Editorial review of E. Lawson Lomax's paper, and of A. E. Dunstan and F. B. Thole's paper.

Stability of Paraffin Hydrocarbons (75788 A). Gustav Egloff and Robert J. Moore. 4000 w. Met & Chem Eng—Jan. 1, 1917. Results of experiments.

**Hydrogen**

Commercial Hydrogen (75582). 2000 w. Times Eng Supp—Nov. 24, 1916. Methods of manufacture and varied uses.

**Illinois**

Oil Investigations in Illonois in 1916 (76956 N). Maps & Ills. 68 pp. Univ Ill—Bul. No. 35. Review of areas by Fred H. Kay, Albert D. Brokaw, Stuart St. Clair, and Charles Butts.

**Jack Pumping**

Central Power and Jack-Pumping Plants for Operation of Oil Wells (78622 A). Roy M. Barnes. Ills. 3000 w. West Eng—May, 1917. Serial, 1st part. Abstract of thesis. First of two articles on jack-pumping.

**Linseed Oil**

The Manufacture of Linseed Oil (79643 A). Glenn H. Pickard. 6500 w. Met & Chem Eng—July 1, 1917. Methods and apparatus used in America. Read before Am. Inst. of Chem. Engrs.

**Mine Gas**

Mine Gas (78667 A). 3000 w. Colly Gdn—Apr. 27, 1917. Reviews a work published in Petrograd by W. N. Chernitzyn on conditions of its liberation, its properties, and approved methods for coping with it.

**Natural Gas**

Natural Gas in 1915 (76316 N). John D. Northrop. 90 pp. U S Geol Surv, II: 31—Dec. 29, 1916. Statistical review of the production and consumption in the United States.

The Ratio of the Specific Heats and the Coefficient of Viscosity of Natural Gas from Typical Fields (76474 A). 2500 w. A S M E, Jl—Feb., 1917. Discussion of Robert F. Earhart's paper, with closure.

**Oil**

Storing and Measuring Oil from a California Gusher (75165). George D. Roalfe. Ills. 2000 w. Eng News—Dec. 7, 1916: Emergency provision of oil reservoir.

**Oil and Gas**

First Annual Report of the State Oil and Gas Supervisor of California for the Fiscal Year 1915-16 (77667 N). R. P. McLaughlin. Ills. 270 pp. Calif. State Print Office—Bul. No. 75.

The Practical Value of Oil and Gas Bureaus (79156 D). W. G. Matteson. 1000 w. A I M E, Bul—June, 1917. Possibilities of such bureaus and their value to the public.

The Practical Value of Oil and Gas Bureaus (81593 D). 2500 w. A I M E, Bul —Oct., 1917. Discussion of W. G. Matteson's paper.

**Oil Derricks**

Prevention of Oil-Derrick Failures in Wind Storms by Improved Method of Guying (76680 A). F. B. Tough. Ills. 2500 w. West Eng—Feb., 1917. Describes method now used by some companies.

**Oil Fields**

The Evidence of the Oklahoma Oil Fields on the Anticlinal Theory (78142 D). 9 pp. A I M E, Bul—April, 1917. Discussion of Dorsey Hager's paper.

The Evidence of the Oklahoma Oil Fields on the Anticlinal Theory (76592 D). Dorsey Hager. 1000 w. A I M E, Bul—Feb., 1917. Information confirming the theory and the value of geology in the Kansas and Oklahoma oil fields.

Fire and Explosive Hazards in the Oklahoma Oil Fields (79989). Earl T. Noland. 1200 w. Mfrs' Rec—July 19, 1917. Extensive hazards; precautions; protection, etc.

The Absence of Water in Certain Sandstones of the Appalachian Oil Fields (79957 B). Frank Reeves. Ills. 25 pp. Ec Geol—June, 1917. A study of the problem and conclusions.

Funnel and Anticlinal-ring Structure Associated with Igneous Intrusions in the Mexican Oil Fields (80290 D). V. R. Garfias, and H. J. Hawley. 12 pp. A I M E, Bul—Aug., 1917. Geologic study with data and conclusions.

The Irvine Oil Field, Estill County, Kentucky (81125 N). Eugene Wesley Shaw. Ills. & Maps. 50 pp. U S Geol Surv, Bul. 661-D—Sept. 5, 1917. History, geography, geology, structure, deposits, etc.

**Oil Refining**

The Trumble Refining Process (81520 A). N. W. Thompson. Ills. 2000 w. A S M E, Jl—Oct., 1917. Method of oil distilling, effecting a marked saving in the percentage of oil required as fuel.

**Oil Resources**

Oil Resources of Black Shales of the Eastern United States (76645 N). George H. Ashley. 18 pp. U S Geol Surv, Bul. 641-L—Feb. 8, 1917. Occurrence.

**Oils**

The Analysis of Light Oils (76986 A). Gustav Egloff. 3000 w. Met & Chem Eng—March 1, 1917. Method embodying safety from fire, rapidity, and accuracy.

The Oxidation of Mineral Oils by Air. I. The Effect of Sulfur on the Oxidation of Hydrocarbons with Particular Reference to Asphalt (80276 B). Benjamin T. Brooks and Irwin W. Humphrey. 1000 w. Jl Ind & Eng Chem—Aug., 1917. Serial, 1st part. Investigations. Apparatus and methods.

The Analysis of Sulfated Oils (80947 B). Ralph Hart. 2500 w. Jl Ind & Eng Chem—Sept., 1917. Present methods and new method.

Oils and Their Use in Railway Service (80321). B. C. Gesner. 3500 w. Ry Rev —Aug. 4, 1917. Explains the mechanics of lubrication, qualities of bearing surfaces, etc.

**Oil Shale**

Oil Shale in Northwestern Colorado and Adjacent Areas (76323 N). Dean E. Winchester. Ills. & Maps. 60 pp. U S Geol Surv, Bul 641-F—Dec. 18, 1916. Economic study.

**Oil Shortage**

Measures Recommended for Relieving the California Oil Shortage (80507 A). Map. 4500 w. West Eng—Aug., 1917. Abstract of committee's report on the petroleum situation.

**Oil Supply**

Sources of Oil Supply (78674 A). John Thompson, with short discussion. 3300 w. Ir & Cl Trds Rev—Apr. 27, 1917. Mineral, vegetable, and mineral oils, and their uses.

**Oklahoma**

Structure of the Northern Part of the Bristow Quadrangle, Creek County, Oklahoma, with Reference to Petroleum and Natural Gas (80859 N). O. E. Fath. Maps. & Ills. 30 pp. U S Geol Surv, Bul 661-B—July 26, 1917. Information collected.

**Petroleum**

Problems Connected with the Recovery of Petroleum from Unconsolidated Sands (75265 D). William H. Kobbe. Ills. 9500 w. A I M E, Bul—Dec., 1916. Determining factors in the selection of drilling method; rules governing the drilling, etc.

Petroleum in 1915 (75429 N). John D. Northrop. 200 pp. U S Geol Surv, II:27 —Dec. 13, 1916. Review of yield and development in the oil fields of the United States.

The Analytical Distillation of Petroleum (76175). W. F. Rittman and E. W. Dean. 70 pp. U S Bur Mines—Bul. 125. Experiments made to determine a satisfactory standard method.

The Nature and Origin of Petroleum and Asphalt (75785 A). Clifford Richardson. 1500 w. Met & Chem Eng—Jan. 1, 1917. Theoretical discussion on the basis of principles of colloidal chemistry.

L'Industrie Du Pétrole En Roumanie (76987 B). J. Vichniak. Ills. 3500 w. Gen Civ—Jan. 13, 1917. Location of wells, production, export, etc.

Occurrence of Petroleum in England (76549 A). Abstract of paper by William Forbes Leslie, before Inst. of Petroleum Technologists. 1500 w. Colly Gln—Jan. 19, 1917. The depth of oil-containing beds is discussed and resources estimated.

Possible Existence of Oilfields in England (76981). 1200 w. Times Eng Supp —Jan. 26, 1917. Abstract of paper by W. Forbes-Leslie.

The Petroleum Industry in Louisiana (76757 A). H. A. Pallfelt, with discussion. Map. 15 pp. La Eng Soc, Pro—Feb., 1917. Oil and gas fields, production, etc.

Problems Connected with the Recovery of Petroleum from Unconsolidated Sands (77440 D). 2000 w. A I M E, Bul—March, 1917. Discussion of William H. Kobbé's paper.

Benzene, Toluene, and Xylene from Petroleum (78424 A). Gustav Egloff. 2500 w. Met & Chem Eng—May 1, 1917. Review of work done on the cracking of petroleum.

The Detection and Determination of Sulfur in Petroleum (78482 B). C. K. Francis and C. W. Crawford. From a thesis in partial fulfillment of requirements for degree of Master of Science. Ills. 2000 w. Jl Ind & Eng Chem—May, 1917. Tests and methods.

The Petroleum and Gasoline Situation (78997 A). Van H. Manning. Address in Washington. 1500 w. Met & Chem Eng—June 1, 1917. Supply and demand, and need of conservation. Wastes to be avoided.

Relation of Sulphur to Variation in the Gravity of California Petroleum (79855 D). G. Sherburne Rogers. 17 pp. A I M E, Bul—July, 1917. Chemical action of sulphur and oxygen on petroleum, relation of gravity to sulphur content, reactions outlined on the migration and origin of oil.

The Development of the Petroleum Industry in Assam (80372 A). H. S. Maclean Jack. 6000 w. Roy Soc Arts, Jl—July 13, 1917. Account of the development in this province of India.

The Estimation of Petroleum Reserves (80288 D). Robert W. Pack. 13 pp. A I M E, Bul—Aug., 1917. Outlines methods that have been used in estimating the available supply, and describes methods used by writer.

Petroleum Production in England (81056 A). Albert Lidgett. 3000 w. Autocar—Aug. 25, 1917. Possibilities of obtaining future supplies from oil wells under government control.

Report of Committee on Petroleum (81328). 3000 w. Min & Sci Pr—Sept. 22, 1917. Some of the conclusions and suggestions. Appreciation of committee report on the oil resources of California and their use.

A Few Notes on the Future Work of the Petroleum Geologist in the Mid-Continent Oil Fields (81587 D). Dorsey Hager. 1200 w. A I M E, Bul—Oct.,

1917. Future work must be more in the line of intensive development than hope of finding new fields.

The Petrology of Reservoir Rocks and Its Influence on the Accumulation of Petroleum (81682 B). A. W. Lauer. Plates. 38 pp. Ec Geol—Aug., 1917. Reviews previous theories and effect of porosity under such conditions.

Review of Present Knowledge Regarding the Petroleum Resources of South America (81586 D). Frederick G. Clapp. 52 pp. A I M E, Bul—Oct., 1917. Aims to give known information of the petroleum in S. A. as a whole.

**Pumping**

Comparative Costs of Developing Power for Pumping in the Oil Fields (80234 A). S. G. Gassaway. Ills. 2500 w. Gen Elec Rev—Aug., 1917. Comparison of operating data and costs showing saving by use of electric power.

**Pumping Plant**

Natural-Gas Pumping Station at Roystone (78028). Harold B. Bernard. Ills. 1000 w. Power—April 17, 1917. Combined steam-engine and gas-engine plant.

**Refractories**

Refractories (75584). 1800 w. Times Eng Supp—Nov. 24, 1916. Problems of production in England. Research, and the gas industry.

Refractory Materials (74984 A). 7800 w. Ir & Cl Trds Rev—Nov. 10, 1916. Serial, 1st part. General discussion by the Faraday Society, opened by Sir Robert Hadfield.

**Retorts**

Vertical Retorts In Gas Making (75583). 1100 w. Times Eng Supp—Nov. 24, 1916. Discussion of cost and approximate working life.

**Shale Oil**

The Scottish Shale Oil Industry (77657 A). 1800 w. Engr—March 9, 1917. Serial, 1st part. General treatment in this first of two articles.

**Spontaneous Ignition**

The Spontaneous Ignition Temperatures of Liquid Fuels (79945 A). Harold Moore. 3000 w. Engr—June 22, 1917. Results of research work.

**Sulfonating Kettles**

Some Notes on Sulfonating Kettles (80530 A). Frederick Pope. Ills. 2200 w. Met & Chem Eng—Aug. 15, 1917. Methods of controlling temperatures, methods of agitation, and forms of kettles.

**Tecuanapa**

Estudio Del Campamento De Tecuanapa (75559 N). Ills. 13000 w. Bol Pet—Nov., 1916. Description, location and methods at oil wells in Vera Cruz, Mexico.

**Texas**

The Corsicana Oil and Gas Field, Texas (81126 N). George Charlton Matson and Oliver Baker Hopkins. Maps & Diagrams. 42 pp. U S Geol Surv, Bul 661-F —Aug. 30, 1917. Account of the history, production and geology.

**Vegetable Oils**

The Production and Industrial Employment of Vegetable Oils (77011 A). 3000 w. Engr—Feb. 9, 1917. Serial, 1st part. Considers vegetable fatty oils, from the British engineer's standpoint, in the production and industrial uses.

**Waste**

Desperdicio de los Recursos Naturales (75558 N). A. Langarica. 3800 w. Bol Pet—Nov., 1916. Estimation of available sources of oil and gas in Mexico, and present wasteful methods in use.

**Well Driving**

Well Driving with the Hydraulic Rotary (78759 A). H. W. Fletcher. Ills. 1500 w. Sib Jl Eng—May, 1917. Details of method of drilling oil wells.

**Well-Log Statistics**

The Need and Advantages of a National Bureau of Well-Log Statistics (76600 D). W. G. Matteson. 1500 w. A I M E, Bul —Feb., 1917. Legislation needed for protection of gas and oil wells. Plans suggested.

The Need and Advantages of a National Bureau of Well-Log Statistics (78143 D). 2500 w. A I M E, Bul—April, 1917. Discussion of W. G. Matteson's paper.

**Wells**

A Feasible Plan for Gaging Individual Wells (79152 D). Roswell H. Johnson and W. E. Bernard. Ills. 300 w. A I M E, Bul—June, 1917. Explains plan for measurement.

**West Virginia**

The Possibility of Deep Sand Oil and Gas in the Appalachian Geo-Syncline of West Virginia (78141 D). 1500 w. A I M E, Bul—April, 1917. Discussion of David B. Reger's paper.

## ORE DRESSING

**Antimony**

Some Studies on the Methods of Recovering Antimony from its Ores by Volatilization Processes (77445 N). J. A. De Cew. Ills. 5000 w. Can Soc C E— March 15, 1917. Processes used.

**Baghouse**

The Baghouse of the St. Joseph Lead Co. (76761). S. Paul Lindau. Ills. 2200 w. Eng & Min Jl—Feb. 17, 1917. Details of plant and manner of shaking bags mechanically.

**British Columbia**

Grand Forks and Phœnix, British Columbia (76976). T. A. Rickard. Ills. 4000 w. Min & Sci Pr—Feb. 24, 1917. The Granby smelter and its operation, and the properties it serves.

**Chromates**

Manufacture of Chromates from Chromite (75240). Harold French. 1200 w. Min & Sci Pr—Dec. 9, 1916. Methods.

**Classification**

An Improved System of Classification (78418). James M. Hyde. Ills. 3000 w. Min & Sci Pr—Apr. 28, 1917. Province of gravity concentration as opposed to flotation; classification for flotation.

**Cobalt**

Notes on Metallurgy at Cobalt During 1916 (77189). R. B. Watson. 1500 w. Can Min Jl—March 1, 1917. Principally concerning the flotation process.

**Concentration**

Dry Concentration of Gold Ore (76765). Leonard Goodday. Ills. 1500 w. Eng & Min Jl—Feb. 17, 1917. Plant in West Australia, successfully operated.

Concentration at Humboldt, Arizona (79919 B). George M. Colvocoresses. 2500 w. Eng & Min Jl—July 14, 1917. (Special.) Details of plant.

The Hancock Jig in the Concentration of Lead Ores (80291 D). Harold Rabling. Ills. 12 pp. A I M E, Bul—Aug., 1917. Report of tests made to determine the conditions for most effective work, and the nature of the products that could be made.

Concentration Practice in Southeast Missouri (81581 D). A. P. Watt. Maps & Ills. 88 pp. A I M E, Bul—Oct., 1917. Methods used in concentrating the disseminated lead ore; character of the ore, machines used, etc.

**Concentrator**

The Burro Mountain Concentrator (79920 B). F. C. Blickensderfer. Ills. 5000 w. Eng & Min Jl—July 14, 1917. (Special.) Copper-concentrating plant at Tyrone, N. M.

**Converters**

Converter Aisle of the Washoe Reduction Works, Anaconda Copper Mining Company, Anaconda, Montana (75098). W. C. Capron. Ills. 1500 w. Elec Jl—Dec., 1916. Detailed description.

**Copper Refining**

By-Products in Electrolytic Copper Refining (80529 A). Lawrence Addicks. 7000 w. Met & Chem Eng—Aug. 15, 1917. Second article of a series, discusses the working of impure metallurgical products into satisfactory marketable materials.

**Cottrell Process**

The Cottrell Process in Practice (77354 A). Linn Bradley. Ills. 5500 w. Met & Chem Eng—March 15, 1917. Read at joint meeting of A. I. M. E. and A. E. S. Latest developments in fume precipitation.

**Crushing Plant**

The United Verde Crushing Plant (80068). T. C. Roberts. 1800 w. Eng & Min Jl—July 21, 1917. Installation described.

**Cyanidation**

Cyanidation Methods of Comacaran Mines, Central America (80169 N). William M. D'Arcy Irvine. 1500 w. Qnsd Gov Min Jl—June, 1917. Account of operation.

**Cyanide Mill**

The Nevada Wonder Mill (74845). Arthur C. Daman. Ills. 1000 w. Eng & Min Jl—Nov. 25, 1916. Ten-stamp mill, particularly its method of power distribution.

The Big Pine Cyanide Mill (75353). C. H. Dunning. Ills. 1500 w. Eng & Min Jl—Dec. 16, 1916. 80-ton plant. cyaniding low-grade gold ores at a cost of $1.37 per ton.

The Rochester Cyanide Mill (76106). A. C. Daman. Ills. 2000 w. Eng & Min Jl—Jan. 20, 1917. As near automatic operation as possible.

The Tom Reed Mill, Oatman, Ariz. (79918 B). H. P. Flint. Ills. & Flow sheet. 1500 w. Eng & Min Jl—July 14, 1917. (Special.) How the capacity of the mill was brought up to allow a satisfactory profit.

**Cyaniding**

Cyaniding at Comacaran Mines, Central America (79045). William M. D'Arcy. Diagram. 1500 w. Eng & Min Jl—June 2, 1917. Successful plant in Salvador.

**Decantation**

Countercurrent Decantation (75248 D). Luther B. Eames. 4500 w. A I M E, Bul—Dec., 1916. Principles and characteristics of the process.

**Drum Filters**

Continuous Drum Filters (79925 B). Carl J. Trauerman. 3000 w. Eng & Min Jl—July 14, 1917. (Special.) Details of operation of filters of the Oliver and Portland type.

**Dust Losses**

Determination of Dust Losses at the Copper Queen Reduction Works (75252 D). 1500 w. A I M E, Bul—Dec., 1916. Discussion of J. Moore Samuel's paper.

**Flotation**

Advancements and Present Status of Preferential Flotation (74718). Henricus

J. Stander. 3000 w. Min. & Eng. Wld—Nov. 18, 1916. Chief methods.

A New Flotation Oil and a New Source of Flotative Agents (74638 D). 1200 w. A I M E, Bul—Nov., 1916. Discussion of the papers of Maxwell Adams and G. H. Clevenger.

Flotation at the Calaveras Copper—A Simple Flow-Sheet (74964). Hallet R. Robbins. Ills. 3000 w. Min & Sci Pr—Nov. 25, 1916. Successful treatment at a copper mine in California.

Flotation Concentration at Anaconda, Mont. (74637 D). 3500 w. A I M E, Bul—Nov., 1916. Discussion of the paper of Frederick Laist and Albert E. Wiggin.

Flotation Experiments, Department of Research and Testing, Colorado School of Mines (74599 N). W. H. Wright. Ills. 25 pp. Col Sl Min Qt—April, 1916. Phases of the work.

Flotation Tests on an Antimony Gold Ore (74398). Earl R. Pilgrim. 500 w. Eng & Min Jl—Nov. 4, 1916. Experiments on a stibnite ore with irregular distribution of gold in quartz.

History of the Flotation Process at Inspiration (74636 D). 4500 w. A I M E, Bul—Nov., 1916. Discussion of the paper of Rudolf Gahl.

Hyde Flotation Suit (74591 A). 2500 w. Met & Chem Eng—Nov. 15, 1916. Hearing before the supreme court.

Interesting Points in the U. S. District Court Flotation Decision (74590 A). A. Schwarz. 2200 w. Met & Chem Eng—Nov. 15, 1916. Letter criticising decision of Judge Bradford.

Flotation in 1916 (75791). Ills. 5000 w. Min & Sci Pr—Jan. 6, 1917. Review of progress during past year.

Flotation of Gold and Copper Ores, Mount Morgan (76134 N). W. Shellshear. 1200 w. Qnsd Gov Min Jl—Dec. 15, 1916. Experiments.

Flotation of Stibnite Ores (76338). Joseph Daniels and C. R. Corey. 2000 w. Eng & Min Jl—Jan. 27, 1917. Tests on flotation of Alaskan antimony ores.

Flotation's Remarkable Advance in 1916 (75739). Ills. 3000 w. Min & Eng Wld—Jan. 6, 1917. Editorial review of progress during past year.

Progress of Flotation in 1916 (75766). Herbert A. Megraw. 4500 w. Eng & Min Jl—Jan. 6, 1917. Review of progress and development.

Supreme Court Decision in Hyde Flotation Suit (75783 A). 3500 w. Met & Chem Eng—Jan. 1, 1917. Complete text of decision of Supreme Court, written by Judge Clarke.

Bibliography of Recent Literature on Flotation of Ores, Jan. to June, 1916 (76831). D. A. Lyon, O. C. Ralston, F. B. Laney and R. S. Lewis. 12 pp. U S Bur Mines—Tech. paper 135.

Flotation Concentration Experiments on a Transvaal Gold Ore (76688 N). F. Wartenweilder, with short discussion. 1700 w. C M M S S A, Jl—Nov., 1916. Application as a supplementary ore dressing step.

Notes on Flotation—1916 (76598 D). J. M. Callow. Ills. 30 pp. A I M E, Bul—Feb., 1917. Late practice and conclusions.

The Rork-Sandberg Flotation Machine (76870). George C. Westby. Ills. 800 w. Eng & Min Jl—Feb. 24, 1917. A machine of novel arrangement that has given successful results.

A New Flotation Machine (77356 A). Ills. 900 w. Met & Chem Eng—March 15, 1917. Details of the K. & K. flotation machine.

Crowder - Elmore - Flotation (76975). Hedley Dawn Crowder. Letter and editorial. 3500 w. Min & Sci Pr—Feb. 24, 1917. Contribution to the discussion as to the discovery of the oil process.

The History of Flotation (77396). T. A. Rickard. 3500 w. Min & Sci Pr—March 17, 1917. Serial, 1st part. Early development of the process.

An Explanation of the Flotation Process (75262 D). 900 w. A I M E, Bul—Dec., 1916. Discussion of the paper of A. F. Taggart and F. E. Beach.

Chronology of Flotation (75174). William Motherwell. 1500 w. Eng & Min Jl—Dec. 9, 1916. List of plants using various kinds of flotation processes.

Individual Motor Drive for Flotation Machines (75100). E. Shores. Ills. 1000 w. Elec Jl—Dec., 1916. Successfully applied.

The Flotation of Minerals (75263 D). 700 w. A I M E, Bul—Dec., 1916. Robert J. Anderson's paper is discussed.

Flotation at the Suan Concession (78043). 500 w. Min & Sci Pr—April 14, 1917. Flotation following table-concentration; difficulty in floating arsenides, etc.

Flotation Litigation (78042). T. A. Rickard. 6800 w. Min & Sci Pr—April 14, 1917. Précis of the litigation over flotation patents.

Notes on Flotation—1916 (78138 D). 15 pp. A I M E, Bul—Discussion of J. M. Callow's paper.

The Disposal of Flotation Products (77871). Robert S. Lewis. Ills. 7500 w. Min & Sci Pr—April 7, 1917. Investigation of methods of handling flotation concentrate.

The Flotation Method of Ore Concentration (77923 A). 1500 w. Nature—March 22, 1917. Explanatory theories, and the importance of the discovery.

Hydraulic Flotation Machine (77980). Arthur Crowfoot. Ills. 800 w. Eng & Min Jl—April 14, 1917. Used in Arizona Copper Co.'s plant, utilizes gravity fall.

Beneficial Effect of Grinding with Steel Balls for Flotation (78629). Victor Zachert. 1500 w. Min & Sci Pr—May 12, 1917. Shows that magnetism is an important force.

Notes on Flotation—1916 (78725 D). 1000 w. A I M E, Bul—May, 1917. Discussion of the paper of J. M. Callow.

The Cascade Flotation Machine (78755). Clifford R. Wilfley. Ills. 1800 w. Eng & Min Jl—May 19, 1917. A device for forming froths without power.

The Theory of Ore Flotation (78483 B). H. P. Corliss and C. L. Perkins. 7000 w. Jl Ind & Eng Chem—May, 1917. Explanation of factors involved in ideal flotation.

Percentage of Oil in Flotation (78535). Herbert A. Magraw. 2500 w. Eng & Min Jl—May 5, 1917. The amount of oil to secure commercial results.

Petrography as an Aid to Flotation (78920). Donald G. Campbell. Ills. 2000 w. Eng & Min Jl—May 26, 1917. Shows aid given by petrographic study of minerals.

Present Flotation Practice on Cobalt Ores (79125 N). J. M. Callow and E. B. Thornhill. 2000 w. Can Min Ist, Bul—June, 1917. Adoption by the Cobalt mill operators for recovery of silver.

Theory of Ore Flotation (79198). H. P. Corliss and C. L. Perkins. 6000 w. Min & Sci Pr—June 9, 1917. Explanation of the actual factors involved in ideal flotation.

The Philadelphia Flotation Decision (79464). 4000 w. Eng & Min Jl—June 23, 1917. Serial, 1st part. Summing up of Judge Woolley in the appealed case of Minerals Separation, Ltd., against Miami Copper Co.

Answers to Questions on the Flotation of Ores (79818). Oliver C. Ralston. 23 pp. U S Bur Mines—Tech paper 149. Twenty-four questions answered.

Flotation—The Butte & Superior Case (80191). 3000 w. Min & Sci Pr—July 28, 1917. Serial, 1st part. Part of argument of Walter A. Scott for the defendant.

Inhibitory Films in Flotation (79918 B). Will H. Coghill. 5000 w. Eng & Min Jl—July 14, 1917. (Special.) Study of the action of films on mineral and other particles in relation to the effect on the flotation process.

Notes on Flotation—1916 (79857 D). 1200 w. A I M E, Bul—July, 1917. Discussion of J. M. Callow's paper.

Principles of Flotation (79807). T. A. Rickard. Ills. 6000 w. Min & Sci Pr—July 7, 1917. Serial, 1st part. States the fundamental principles governing flotation.

Selective Lead-Zinc Flotation (79917 B). Luther L. Kirtley. 2000 w. Eng & Min Jl—July 14, 1917. (Special.) System for separating lead and zinc by variations of the application of flotation.

Control of Emulsions in Flotation (80611). Courtenay De Kalb. 4500 w. Min & Sci Pr—Aug. 18, 1917. Principles of emulsification. How to control emulsions for the oiling of bubble films, etc.

Flotation Tests on Gold Ores (80502). Edwin Joyce. 900 w. Min & Sci Pr—Aug. 11, 1917. Experiments on an Oregon gold ore.

Launder Flotation Machine (80503) B. M. Snyder. Ils. 700 w. Min & Sci Pr—Aug. 11, 1917. A continuous flotation apparatus designed by George Crerar.

The Flotation of Gold and Silver Mineral (80798). T. A. Rickard. Ills. 7000 w. Min & Sci Pr—Aug. 25, 1917. General remarks introductory to analyses of specific conditions at various mills.

Concentrating Copper Ore by Flotation, at an Ontario mine (81005). A. G. Morrison. 1500 w. Can Min Jl—Sept. 1, 1917. Details of an important Ontario property that operates on copper ores exclusively.

Cyanidation of Flotation Concentrate (81208). James G. Parmelee. 2000 w. Min & Sci Pr—Sept. 15, 1917. Notes on an important phase of the flotation process. Effect of oil; removal of oil; solvents for oil. Results of cyaniding.

Text of Judge Bourquin's Decision in Butte & Superior Flotation Case (81112). Also editorial. 6200 w. Eng & Min Jl—Sept. 15, 1917.

Bibliography of Recent Literature on Flotation of Ores (81578). Compiled by D. A. Lyon, O. C. Ralston, F. B. Laney, and R. S. Lewis. 22 pp. U S Bur Mines—Tech paper 176. Covers from July to December inclusive, 1916.

Canadian Wood Oils for Ore Flotation (81627 N). R. E. Gilmore and C. S. Parsons. 4000 w. Can Min Inst, Bul—Oct., 1917. Serial, 1st part. Results of an investigation.

Chemicals Used in Flotation (81809). O. C. Ralston and L. D. Yundt. 4000 w. Min & Sci Pr—Oct. 13, 1917. Theories to explain effect of acids. Use of certain chemicals described.

Flotation of Lead and Zinc in the Joplin District (81948). C. A. Wright. 3000 w. Min & Sci Pr—Oct. 20, 1917. Tests on adaptation of flotation process to Joplin ores.

"Northern Miner" and "Toronto World" Say Minerals Separation N. A. Corporation Is Controlled by Germans (81892). Also editorial. 2000 w. Can Min Jl—Oct. 15, 1917. Examination of charges made.

Preferential Flotation (82110). W. Shellshear. 5000 w. Min & Sci Pr—Oct. 27, 1917. Early work at Broken Hill; the Horwood process, etc.

**Flotation Machine**

Launder Flotation Machine (75356). B. M. Snyder. Ills. 1000 w. Eng & Min Jl—Dec. 16, 1916. Details of a pneumatic type.

**Fumes**

The Thiogen Process for Removing Sulphur Fumes (77348 A). S. W. Young. 2200 w. Met & Chem Eng—March 15, 1917. Details of process.

**Grinding**

A Comparative Test of the Marathon, Chilean and Hardinge Mills (75258 D). 6000 w. A I M E, Bul—Dec., 1916. Discussion of F. C. Blickensderfer's paper.

**Grinding Pebbles**

Tests of Baraboo Quartzite Pebbles (80604). W. O. Hotchkiss. 1200 w. Eng & Min Jl—Aug. 18, 1917. Results of tests. Quartzite proves better than flint.

**Hardinge Mill**

Tests on the Hardinge Conical Mill (78145 D). Arthur F. Taggart. Ills. 30 pp. A I M E, Bul—April, 1917. Details of laboratory work.

Tests on the Hardinge Conical Mill (80295 D). 3000 w. A I M E, Bul—Aug., 1917. Discussion of A. F. Taggart's paper.

Tests on the Hardinge Conical Mill (81592 D). 2500 w. A I M E, Bul—Oct., 1917. Discussion of A. F. Taggart's paper.

**Hydro-Metallurgy**

Hydro-Metallurgy of Lead-Silver at the Bunker Hill Smelter (80799). Clarence L. Larson. Ills. 3000 w. Min & Sci Pr—Aug. 25, 1917. Discusses the general characteristics of a process developed in the laboratory on a small experimental scale.

**Kalgoorlie**

Ore Treatment at the Perseverance Mine, Kalgoorlie, West Australia (78711 A). W. R. Cloutman, with editorial. 5500 w. Min Mag—April, 1917. Serial, 1st part. On the geology and mining and metallurgical practice.

**Leaching**

Winona Copper-Leaching Test Plant (74846). 2000 w. Eng & Min Jl—Nov. 25, 1916. Five-ton Slater-process plant with results.

Leaching of Low-Grade Copper Ores (78921). Joseph Irving. Ills. 1500 w. Eng & Min Jl—May 26, 1917. Account of what is being done in leaching with and without preliminary roasting.

**Matte Granulation**

Matte Granulation at Herculaneum, Mo. (74644 D). S. Paul Lindau and Henry B. Smith. Ills. 1500 w. A I M E, Bul—Nov., 1916. Methods.

**Metallurgy**

Western American Metallurgy (77080). Map. 5000 w. Min & Sci Pr—March 3, 1917. Review of metallurgical practice, particularly the treatment of disseminated copper ores.

**Mill**

The Proposed Corocoro Mill, Bolivia (79268). Mark R. Lamb. Ills. 1200 w. Eng & Min Jl—June 16, 1917. Mill about to be built in Bolivia for the treatment of copper ore.

**Milling**

Notes on Milling Practice at the McIntyre Mine, Porcupine, Ont. (80462 N). A. Dorfman, with discussion. Ills. 3000 w. Can Min Inst, Bul—Aug., 1917. Features of present practice.

**Milling Control**

The Empirical Formula in Milling Control (79671). A. J. Sale. 1200 w. Min & Sci Pr—June 30, 1917. Development of formula for calculating ratio of concentration and percentage of extraction from assays.

**Milling Practice**

The Milling Practice of the St. Joseph Lead Co. (81216 D). L. A. Delano. Ills. 20 pp. A I M E, Bul—Sept., 1917. Historical summary; description of plants, practice, etc.

**Mill-Pulp**

Simple Methods of Finding Density and Weight of Solids in Mill-Pulp (81209). R. B. Kiliani. Ills. 700 w. Min & Sci Pr—Sept. 15, 1917. A formula and its use.

**Mills**

Mill and Smelter Construction in 1916 (75738). Ills. 25000 w. Min & Eng Wld—Jan. 6, 1917. Editorial review.

**Murex Process**

Oil Concentration of Lead Carbonate at Darwin, California (79915 B). H. S. Rexworthy. Ills. 1200 w. Eng & Min Jl—July 14, 1917. (Special.) How an ore difficult to handle was benefitted by an application of the Murex magnetic-paint process.

**Nickel**

Development of Nickel Refining Processes (79236). U. N. Hybinette. 6000 w. Can Min Jl—June 15, 1917. Evidence before Ontario Nickel Commission, London, England, 4th of April, 1916.

**Ore Tramway**

New Tramway at the Tacoma Smeltery (79046). W. C. Kuhn. Ills. 1000 w Eng & Min Jl—June 2, 1917. Constructed for storage or bedding of ores. Selective dumping arrangements.

**Ore Treatment**

Notes on Treatment of Pilgrims Rest Ore (79932 N). Robert Lindsay, with discussion. 5000 w. Chem, Met, & Min Soc of S Af—April, 1917. Details of the treatment of oxidized gold ore.

Ore Treatment at the Falcon Mine (Rhodesia) (76689 N). H. R. Adam. Ills. 3000 w. C M M S S A, Jl—Nov., 1916. Outlines the milling and smelting processes, and interesting points in practice.

An Ore-Testing Laboratory (79641). Carl J. Trauerman. Ills. 2500 w. Eng & Min Jl—June 30, 1917. Details of a laboratory established to work out a milling process.

**Phosphoric Acid**

Phosphoric Acid Determination in Phosphate Rock (79640). C. Carleton Semple. 2200 w. Eng & Min Jl—June 30, 1917. Analytical methods applied.

**Phosphor-Tin**

Phosphor-Tin and a Volumetric Method for Its Analysis (79758 B). Richard Edwin Lee, W. H. Fegely, and Frank H. Reichel. 6000 w. Jl Ind & Eng Chem—July, 1917. Develops method and tests.

**Pneumatic Machinery**

Pneumatic Concentrator and Amalgamator (79170). Frank A. Stanley. Ills. 1000 w. Eng & Min Jl—June 9, 1917. Details of machine and results obtained with it.

**Precipitation**

Sodium Sulphide Precipitation of Silver at the Nipissing Mine (74652). R. B. Watson. 1200 w. Can Min Inst, Bul—Nov., 1916. Process limited to silver ores.

A New Method of Zinc Precipitation (76339). H. R. Conklin. Ills. 1200 w. Eng & Min Jl—Jan. 27, 1917. Uses zinc balls or scraps, avoiding expense of dust.

Electrical Precipitation (75103). R. W. Kerns. Ills. 2000 w. Elec Jl—Dec., 1916. Its theory and application at the International Smelting Co.'s plant, Miami, Ariz.

Zinc-Box Work (76622). H. T. Durant. 2500 w. Eng & Min Jl—Feb. 10, 1917. Reviews ways and means of zinc precipitation from cyanide solutions.

Some Theoretical Aspects of Electrical Fume Precipitation (79001 A). W. W. Strong. Read at joint meeting of the A. I. M. E. and the A. E. S 3500 w Met & Chem Eng—June 1, 1917. Conduction of electricity in gases. Physical aspects of the problem.

Copper-Precipitating Plant at Balaklala Mine (80613). S. A. Holman. Ills. 500 w. Min & Sci Pr—Aug. 18, 1917. Simple design for precipitating copper from mine waters.

**Recovery**

Experiments in the Recovery of Tungsten and Gold in the Murray District, Idaho (80292 D). Robert Rhea Goodrich and Norman E. Holden. Ills. 8 pp. A I M E, Bul—Aug., 1917. Investigations and results.

**Refining**

Impurities in Electrolytic Copper Refining (79241 A). Lawrence Addicks. 4000 w. Met & Chem Eng—June 15, 1917. The sources, distribution, and elimination of impurities. Urgent need of improved processes.

Electrolytic Refining at Trail (75490). T. A. Rickard. Ills. 4500 w. Min & Sci Pr—Dec. 23, 1916. Serial, 1st part. Details of a large metallurgical plant.

From Precipitate to Bullion (75239). R. R. Bryan. Ills. 2000 w. Min & Sci Pr—Dec. 9, 1916. Methods of refining.

On the Possibility of Producing Refined Copper in Canada (74764). A. W. G. Wilson. 7000 w. Can Min Jl—Nov. 15, 1916. Pacific Coast the best site for a refinery, equipment required, etc.

On the Superheating of Slags, and Metals During Refining, Smelting and Alloying Operations (81517 A). J. E. Fletcher. Read before Soc. Chem. Ind., England. Ills. 4500 w. Met & Chem Eng—Oct. 1, 1917. Study of the effects.

**Roasting**

Choice of a Blende-Roasting Furnace (81939 B). March F. Chase. Ills. 3500 w. Eng & Min Jl—Oct. 20, 1917. (Special No.) Proper roasting of ore and the suitability of gas for making acid, demand conditions not yet perfectly filled.

**Sampling**

Mill-Tests v. Hand-Sampling (81503). Morton Webber. Ills. 1500 w. Min & Sci Pr—Sept. 29, 1917. Suggests using the mill-test as a corrector for hand-sampling.

Some Observations on Sampling (75175). Irving Herr. Ills. 1800 w. Eng & Min Jl—Dec. 9, 1916. Errors and suggestions for their correction.

**Separator**

Improved Magnetic Separator (74397). August F. Jobke. Ills. 2500 w. Eng &

Min Jl—Nov. 4, 1916. Utilizes several magnetic zones in a given field.

**Settling Problems**

Methods for Determining the Capacities of Slime-Thickening Tanks (77436 D). R. T. Mishler. 22 pp. A I M E, Bul—March, 1917. Outlines investigations at El Tigre, Sonora, Mex.

**Sizing Diagram**

A Uniform Sizing Diagram from Different Screen Standards (81227 D). John Randall. 1200 w. A I M E, Bul—Sept., 1917. Suggestions for a better screen standard.

**Slime**

The Importance of Efficient Settling of Slime (74745). Paul W. Avery. Ills. 1500 w. Min & Sci Pr—Nov. 18, 1916. Results of settling-tests on different slime.

**Slime Dams**

The Construction and Maintenance of Slime Dams (81824 N). Jas. E. Thomas and E. A. Osterloh. Ills. 2000 w. Chem, Met & Min Soc S Af, Jl—June, 1917. Ways and means of avoiding troubles.

**Smelters**

The Bunker Hill Smelter (76607). Jules Labarthe. Ills. 1200 w. Min & Sci Pr—Feb. 3, 1917. Important addition to this metallurgical plant.

**Smelter Smoke**

Results of Recent Investigations of the Smelter Smoke Problem (79752 B). A. E. Wells. Ills. 6000 w. Jl Ind & Eng Chem—July, 1917. Some of the more important features.

**Smelting**

A New Electric Zinc Smelting Process (76450 A). Ills. 1000 w. Met & Chem Eng—Feb. 1, 1917. Information concerning a process developed by Charles H. Fulton.

Hidden Creek Mine and Smeltery (76623). Donald G. Campbell. Ills. 1700 w. Eng & Min Jl—Feb. 10, 1917. Leading features of the Anyox, B. C., copper operations.

The Copper Smelter and Refineries at Great Falls, Montana (78106 A). S. W. Haas. Ills. 2500 w. Corn C E—March, 1917. Details of the plant.

Non-Reversing Regenerative Furnace for Copper Smelting (79032). Walter G. Perkins. Ills. 2500 w. Min & Sci Pr—June 2, 1917. History of methods adopted for utilizing waste gases in reverberatory copper smelting.

Sulphuric Acid from Copper Smelting Gases (75505). E. L. Larison. Ills. 3500 w. Eng & Min Jl—Dec. 30, 1916. Plants operating on gases from copper smelteries. Details of acid manufacture.

Copper Smelting at Santa Lucia (79780). Francis Church Lincoln. Ills. 1500 w. Eng & Min Jl—July 7, 1917. Details of a small smeltery in an out-of-the-way place, with costs of operation.

Electric Smelting of Copper Ores (79829 A). W. Dewar. 4500 w. Min Mag—June, 1917. Results of tests on a silicious ore containing copper as silicate, oxide, and carbonate.

**Smoke**

The History and Legal Phases of the Smoke Problem (76723 A). Read at joint meeting of A. I. M. E. and A. E. S., Jan. 26, 1917. 6500 w. Met & Chem Eng—Feb. 15, 1917. Smelter fume problems.

The History and Legal Phases of the Smoke Problem (78730 D). Ligon Johnson. 14 pp. A I M E, Bul—May, 1917. The smelter fume problem.

The Treatment of Metallurgical Smoke in Japan (81804 A). Tetsurow Komakine. 2000 w. Met & Chem Eng—Oct. 15, 1917. Two methods of investigation.

**Sodium Cyanide**

The Synthetic Making of Sodium Cyanide (81808). G. H. Clevenger. Ills. 4000 w. Min & Sci Pr—Oct. 13, 1917. Tests to check economic possibilities of the Bucher process.

**Strontium Nitrate**

Strontium Nitrate: A New Industry (74965). Donald F. Irwin. 2000 w. Min & Sci Pr—Nov. 25, 1916. Chemical treatment of celestite, yielding a product used in fireworks and railway and marine signals.

**Sulphatizing**

Sulphatizing with Weak Sulphurous Gases (80069). George C. Westby. Ills. 3000 w. Eng & Min Jl—July 21, 1917. Method of utilizing the sulphurous gases derived from roasting or melting pyritic ores.

**Sulphide Mill**

Chemical Engineering Aspect of Renovating a Sulphide Mill (80271 A). Hugh K. Moore. 8500 w. Met & Chem Eng—Aug. 1, 1917. Details of the renovation of a pulp mill in Canada, running on the sulphate process.

**Sulphides**

Sulphuric Acid from Blende (80874 A). H. M. Ridge. Read in London, before Soc. Chem, Ind. Ills. 5500 w. Met & Chem Eng—Sept. 1, 1917. Sources of zinc sulphides with general treatment of sulphide treatment. Types of furnaces, operating details, etc.

A Method for the Determination of Dissociation Pressures of Sulphides, and its Application to Covellite and Pyrite (77359 B). E. T. Allen and Robert H. Lombard. Ills. 20 pp. Am Jl Sci—March, 1917. Details of new method, its advantages and disadvantages.

**Sulphur**

The Wet Thiogen Process for Recovering Sulphur from Sulphur Dioxide in Smelter Gases (80858). A. E. Wells. Ills. 60 pp. U S Bur Mines—Bul 133. A critical study. Report of recent investigations, and comments on present situation.

**Tailings**

Ammonia Leaching of Calumet Tailings (79912 B). C. Harry Benedict. Ills. 5000 w. Eng & Min Jl—July 14, 1917. (Special.) Details of plant for treating tailings containing copper not formerly recoverable.

The Enrichment and Segregation of Mill Tailings for Future Treatment (80294 D). F. E. Marcy. 2500 w. A I M E, Bul—Aug., 1917. Urges segregation of tailings that under better conditions may yield profits.

**Tin**

The Wet Assay of Tin Concentrate (77269 A). H. W. Hutchin. 27 pp. Instn Min & Met, Bul. 149—Feb. o, 1917. Iodine titration, and ferric chloride titration. Methods used.

The Wet Assay of Tin Concentrate (77951 N). 22 pp. Instn Wire & Met, Bul 150. March 15, 1917. Discussion and remarks on H. W. Hutchin's paper.

**Tube Mills**

Tube-Mill Practice in Rhodesia (77382). A. W. Allen. Ills. 1500 w. Eng & Min Jl—March 17, 1917. Comparative tests of tube-mill workings.

**Tungsten**

Modern Concentration of Colorado Tungsten Ores (78652 A). S. Fischer, Jr. Ills. 4000 w. Met & Chem Eng—May 15, 1917. Serial, 1st part. Describes recent developments.

**Zinc**

Notes Upon the Hydrometallurgical and Electrolytic Treatment of Zinc Ore (79000 A). E. E. Watts. 1800 w. Met & Chem Eng—June 1, 1917. Experimental work.

**Zinc Recovery**

Zinc Oxide from Lead Slag (76608). H. B. Pulsifer and George Perlstein. Ills. 1500 w. Min & Sci Pr—Feb. 3, 1917. Furnace equipment and operation.

## PLACER MINING

**Black Sands**

Black Sand of the Pacific Coast (75010). Herbert Lang. 3000 w. Min & Sci Pr—Dec. 2, 1916. Occurrence and treatment of these deposits. Commercial aspects.

**California**

Twenty-One Years' Mining at Yellow Aster (76620). Lewis H. Eddy. Ills. 2500 w. Eng & Min Jl—Feb. 10, 1917. History of low-grade gold property.

**China**

Gold and Silver Mining in Chihli, North Carolina (76668). A. S. Wheler and S. Y. Li. Ills. 5000 w. Min & Sci Pr—Feb. 10, 1917. Methods of mining and metallurgy.

**Dredges**

Three Big American Gold-Dredges (79830 A). Ills. 3500 w. Min Mag—June, 1917. Details of design.

**Dredging**

Electric Power in Gold Dredging (75099). T. D. Prier. 2500 w. Elec Jl—Dec., 1916. Gold dredging in Montana.

Dredging for Gold on Seward Peninsula, Alaska — Season 1916 (75961). Corey C. Brayton. Ills. and Map. 3500 w. Min & Sci Pr—Jan. 13, 1917. Practice under various conditions.

**Gold Dredging**

Commonsense of Gold Dredging (77041). A. C. Ludlum. Ills. 2000 w. Eng & Min Jl—March 3, 1917. Review of the essentials preliminary to a successful gold-dredging operation.

**Mineral Dredging**

Dredging for Minerals (74726 N). F. W. Payne. 1200 w. Min & Eng Rev—Oct. 5, 1916. Retrospective and prospective.

**Nevada**

Placer deposits of the Manhattan District, Nevada (76322 N). Henry G. Ferguson. Maps. 30 pp. U S Geol Surv, Bul 640-J—Jan. 20, 1917. Field work, history, deposits, etc.

**Placers**

Idaho Placer Operations (75927). Julius Hornbein. Ills. 1200 w. Eng & Min Jl—Jan. 13, 1917. Dredging and hydraulicking operations.

**Yukon**

Methods and Costs of Placer Mining in Yukon (74426). 4000 w. Can Min Jl—Nov. 1, 1916. Prospecting, methods of thawing, sluicing, self-dumper, etc.

Operation of the Yukon Placer Act (78536). C. A. Thomas. Ills. 4000 w. Eng & Min Jl—May 5, 1917. Critical discussion.

Scroggie, Barker, Thistle, and Kirkman Creeks, Yukon Territory (79094 N). D. D. Cairnes. Maps and Ills. 43 pp. Can Dept Mines—Mem. 97. Preliminary examination of placer deposits and conditions.

## PRECIOUS METALLURGY

**Alaska**

Metallurgical Methods at Treadwill (77661). S. B. Combest. Ills. 9 pp. Min & Sci Pr—March 24, 1917. Review.

Mining Methods at Ashanti (81890 A). Region, Alaska (82056 N). Stephen R. Capps. Maps. 52 pp. U S Geol Surv—Bul. 662-E. General features of this district; geology; placer and lode deposits.

**Assaying**

Influence of Base Metals in Gold Bullion Assaying (79854 D). Frederic P. Dewey. 8 pp. A I M E, Bul—July, 1917. Investigations to determine the causes of variations.

**Australia**

Proposed Rejuvenation of Bendigo (79463). Abstract of a report by E. C. Dyason. Ills. 2000 w. Eng & Min Jl—June 23, 1917. Outlines consolidation suggested for this old gold camp and results expected.

**Diamonds**

Diamonds in California (76978). W. H. Storms. 3300 w. Min & Sci Pr—Feb. 24, 1917. How they were found.

**Dredge**

California Dredge with Four Tailings Conveyors (79460). Lewis H. Eddy. Ills. 1200 w. Eng & Min Jl—June 23, 1917. System which leaves land in condition for agricultural uses.

**Dredging**

Australian Practice in Pump-Dredging (80443 A). Arthur H. P. Moline. Ills. 9500 w. Min Mag—July, 1917. Experience of a system of treating alluvial deposits containing tin or gold.

**Egypt**

Modern Gold Mining in Ancient Egypt (77079). Ernest H. S. Sampson. Ills. 2500 w. Min & Sci Pr—March 3, 1917. Possibilities of gold and copper mining in the Egyptian desert.

**Fire Assays**

Some Fluxes and Methods Used in Fire Assays (81335). Carl J. Trauerman. 2000 w. Eng & Min Jl—Sept. 22, 1917. Composition of fluxes and details of procedure for assaying ores.

**France**

Les Usines Aurifères Françaises (77570 C + D). L. Guillet. Ills. 4200 w. Rev Met—Sept.-Oct., 1916. Methods employed at metallurgical works in the various districts of France.

**Gems**

Gems and Precious Stones in 1915 (75332 N). Waldemar T. Schaller. 15 pp. U S Geol Surv, II: 29—Dec. 11, 1916. Production in the United States.

**Gold**

Gold and Silver (75759). 1300 w. Eng & Min Jl—Jan. 6, 1917. Incomplete report, due to war conditions.

La Métallurgie Moderne De L'Or (80745 B). H. Volta. Ills. 1800 w. La Nat—July 21, 1917. Modern cyanidation plants in South Africa.

**Gold Dredging**

Gold Dredging in Tierra Del Fuego (77977). Lyman Chatfield. Ills. 1200 w. Eng & Min Jl—April 14, 1917. Conditions described.

**Gold Mine**

The Palidan-Slide Mine (77970 N). V. E. Lednicky. 3500 w. Phil Jl Sci—Sept., 1916. History, description and methods.

**Madagascar**

Les Exploitations Aurifères De Madagascar (76940 B). E. Bernet. Ills. 4400 w. Gen Civ—Jan. 27, 1917. Location, extent and methods of workings of gold-bearing localities.

**Metallurgy**

See same heading under BASE METALLURGY.

**Methods**

Mining Methods at Ashanti (81890 A). H. J. Johnston. Ills. 1500 w. Min Mag—Sept., 1917. Mining of the Obuasi Shoot, Africa, is rendered difficult by the fact that the ore is in places so friable as to be almost a loose rubble and is separated from the wall rock by similar material.

**Milling**

The Milling of Gold Ores (74725 N). J. McCombie. 900 w. Min & Eng Rev—Oct. 5, 1916. Practical hints for operators.

**New Mexico**

The Lordsburg Dstrict, New Mexico (77714). Faris V. Bush. Ills. 1400 w. Eng & Min Jl—March 31, 1917.

**Nicaragua**

Plant of the Babilonia Gold Mines, Nicaragua (75492). S. M. Parker. Ills. 1700 w. Min & Sci Pr—Dec. 23, 1916. The plant and its operation.

**Ontario**

Gold and Silver Mining in Northern Ontario (Retrospective and Prospective) (77191). Homer L. Gibson. 1800 w. Can Min Jl—March 1, 1917. Brief review of present status.

The Kirkland Lake Gold District (78628). G. C. Bateman. Maps & Ills. 3500 w. Min & Sci Pr—May 12, 1917. Geography, geology, output, etc.

The Tashota Gold District, Ontario (80688). R. C. W. Lett. 1500 w. Can Min Jl—Aug. 15, 1917. History of the district.

**Platinum**

Platinum (75760). 600 w. Eng & Min Jl—Jan. 6, 1917. Production, prices, and other particulars, during past year.

**Pocket-Mine**

A Chilean Pocket Gold Mine (77043). E. David Pope. Ills. 2200 w. Eng & Min Jl—March 3, 1917. Brief history of the Putu gold deposit in Chile.

**Precipitants**

Zinc Dust as a Precipitant in the Cyanide Process (81218 D). W. J. Sharwood. 3500 w. A I M E, Bul—Sept., 1917. Methods of applying the zinc dust, and related topics.

**Precipitation**

Aluminum-Dust Precipitation Tests (78045). P. H. Crawford. 2500 w. Min & Sci Pr—April 14, 1917. Report of tests at the Divisadero mill, Republic of Salvador. Discussion of aluminum dust precipitation.

**Queensland**

The Charters Towers Goldfield (77648 N). J. H. Reid. Maps & Ills. 12000 w. Qnsd Gov Min Jl—Feb., 1917. Serial, 1st part. Abridged report. Location, geology, history, and present conditions in Queensland.

New Minnie Moxham Gold Mine, Northcote (80168 N). E. Cecil Saint-Smith. Ills. 3000 w. Qnsd Gov Min Jl—June, 1917. Details of this mine and its development.

**Rand**

Ore Reserves of the Rand (80603). A. Cooper Key. Ills. 100 w. Eng & Min Jl—Aug. 18, 1917. Much of it is low-grade material but capable of being handled at a profit.

**Report**

Gold and Silver in 1915 (77264 N). H. D. McCaskey and J. P. Dunlop. 45 pp. U S Geol Surv, I:25—March 2, 1917. General report.

**Silver**

Diarsenides as Silver Precipitants (78763 B). Chase Palmer. 11 pp. Econ Geol—April-May 1917. Experimental work.

Significant Mineralogical Relations in Silver Ores of Cobalt, Ontario (78764 B). Edson S. Bastin. Ills. 18 pp. Econ Geol—April-May, 1917. A study of ore deposition and origin.

The Belmont Camp, Nevada (79169). Wilson W. Hughes. Ills. 1300 w. Eng & Min Jl—June 9, 1917. Old silver camp resumed. Electric power, new mill, flotation. Results so far obtained, and prospects for the future.

**Silver Ores**

A Microscopic Study of the Silver Ores and Their Associated Minerals (79956 B). F. N. Guild. 56 pp. Ec Geol—June, 1917 Investigations.

## MISCELLANY

**Aluminum Dust**

Analysis of Aluminum Dust (77629). J. E. Clennell. 4000 w. Eng & Min Jl—March 24, 1917. Various methods of estimating the extent of impurities.

**British Empire**

The Mineral Resources of the British Empire ( 75656 A). 1800 w. Engr—Dec. 15, 1916. Serial, 1st part. Reviews papers and discussions at recent meeting of the Society of Engineers, England.

**Butte Decision**

The Butte & Superior Case (81505). Also editorial. 6000 w. Min & Sci Pr—Sept. 29, 1917. Complete text of decision of the U. S. District Court of Montana handed down by Judge Bourquin.

**Canada**

Summary Report of the Mines Branch of the Department of Mines for the Calendar Year Ending December 31, 1915 (76811 A). Ills. 205 pp. Can Dept Mines—No. 421.

**Diamonds**

Diamonds Mined in Arkansas Claimed to Grade with Best the World Produces (80580). Tom Shiras. Ills. 1500 w. Mfrs' Rec—Aug. 16, 1917. Rich returns reported with many valuable gems recovered.

**Honduras**

A Trip Through Honduras (74531). D. McBride. Ills. 2500 w. Eng & Min Jl—Nov. 11, 1916. Account of important features of transportation service, mineral resources, and probable effect of new mining law.

**Industry**

See same heading under MECHANICAL ENGINEERING, *Machine Works and Foundries.*

**Laws**

What Can Uniform Mining Laws Hope to Accomplish? (75054). Van H. Manning. 4500 w. Eng & Min Jl—Dec. 2, 1916. Need of uniform legislation on the subject.

**Metallurgy**

Five Years of Metallurgical Progress (78627). Francis A. Thomson. 1900 w. Min & Sci Pr—May 12, 1917. Review of recent improvements.

**Mineral Resources**

Mineral Resources in War and Their Bearing on Preparedness (80240 A). Joseph E. Pogue. 6000 w. Sci M—Aug.,

1917. Shows how essential are mineral products to the carrying on of war.

**Mine Report**

Sixth Annual Report by the Director of the Bureau of Mines to the Secretary of the Interior, for the Fiscal Year Ended June 30, 1916 (75244 N). 90 pp. U S Bur Mines—Dec., 1916.

**Mining Industry**

The Influence of Science, Education, and Legislation on Mining (77451 N). Wallace Thorneycroft (Presidential address). 12 pp. Instn Min Engrs, Trans —Feb., 1917. With reference to English conditions.

**Nitrogen**

The Determination of Nitrogen in Substances Used in Explosives (80437). W. C. Cope and Guy B. Taylor. Ills. 40 pp. U S Bur Mines—Tech paper 160. Report covering methods used for all classes of compounds containing nitrogen that are used in explosives.

**Radium**

Some Experiments on the Concentration of Radium in Carnotite Ores (74451 B). Albert G. Loomis and Herman Schlundt. 5000 w. Jl Ind & Eng Chem—Nov., 1916. Analysis and treatment of ores, with summary.

**Science and Metallurgy**

La Science Et L'Industrie Métallurgique (75596 C + D). L. Guillet. 10000 w. Soc Enc Ind Nat—Sept.-Oct., 1916. Applications of science to metallurgical industries.

**Tasmania**

Report of the Secretary for Mines for Year Ending Dec. 31, 1915 (76818 N). 133 pp. Tas Mines Dept—1916.

# RAILWAY ENGINEERING

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## CONDUCTING TRANSPORTATION

**Accidents**

Highway Crossing Accidents — Their Cause and How They Can Be Reduced (75888 A). John S. Rockwell. From a paper read at Detroit meeting of Nat. Safety Council. 1800 w. Ry Gaz—Dec. 22, 1916. Means of prevention.

**Advertising**

The Film and the American Railroad (80867). T. T. Maxey. 3000 w. Ry Age Gaz—Aug. 31, 1917. Extensive use for advertising, instruction and entertainment.

**American Railways**

American Railways in War Time (78577 A). 1000 w. Engr—Apr. 13, 1917. What has been done to place the railways on a good working basis for emergency work.

American Railways and the War (80860). Samuel O. Dunn. 4500 w. St L Ry Cb—Aug. 15, 1917. Why it is a railway war. Achievements, efficiency, etc.

**Bascule Interlocking**

New C. & N. W. Bascule Bridge Interlocking (79879). R. M. Phinney. Ills. 2500 w. Ry Sig Engr—July, 1917. Electric plant protecting structure over Chicago River. Interesting application of modern apparatus.

**Block Signals**

Block Signals on the Monon (77897). E. G. Stradling. Ills. 2000 w. Ry Sig Engr—April, 1917. Absolute permissive installation on single track in Indiana.

**British Railways**

British Railways in 1916 (77249 A). 1500 w. Engr—Feb. 23, 1917. Brief review of the annual reports of the railway companies.

British Railways in 1916 (77250 A). 3500 w. Engr—Feb. 23, 1917. Serial, 1st part. Principal points of the reports of the thirteen principal railway companies of the United Kingdom.

The Railways and the War (77654 A). 2500 w. Engng—March 9, 1917. Editorial review of the annual reports.

British Railways in War Time (78161). H. Raynar Wlson. 2000 w. Ry Rev—April 21, 1917. Serial, 1st part. An account of what has been done in England in the way of taking the railways under control.

The Railway Problem. No. 1—British Railways Before the War (80574 A). 2500 w. Engng—Aug. 3, 1917. Serial, 1st part. The pre-war railway position.

The Future of English Railways (78575 A). 1500 w. Engr—Apr. 13, 1917. Reviews an article in *Edinburgh Review* on problems that will arise at close of war.

**Canada**

Canadian Railway Problem (77995). Thomas Tait. 3500 w. Can Engr—April 12, 1917. Advocates one united system of railways.

Canadian Commission Against Public Ownership (78520). J. L. Payne. 4000 w. Ry Age Gaz—May 4, 1917. Suggests plan for solution of difficulties.

Canadian Commission Minority Report (78521). A. H. Smith. 4000 w. Ry Age Gaz—May 4, 1917. Recommends independent operation of railways under private control and ownership.

Canada's Railroad Problem (78504). W. T. Jackman. 2500 w. Can Engr—May 3, 1917. Serial, 1st part. Economic view of its solution. Advantages and disadvantages of government ownership, etc.

Offers Divers Solutions of Canada's Railway Problem (78747). Maps. 4500 w. Eng News-Rec—May 17, 1917. Majority and minority reports of Royal Commission, and a third proposed plan.

Railway Enquiry Commission's Report (78624). 9 pp. Can Engr—May 10, 1917. Facts revealed by Commissioners Drayton and Acworth.

The Canadian Railway Problem

(78750). Henry L. Drayton. From an address before the Canadian Club at Toronto. 2500 w. Can Engr—May 17, 1917. Conditions and conclusions.

**Car Inspectors**

The Selection and Training of Car Inspectors (76736 A). Hiram W. Belnap, with discussion. 30 pp. Cen Ry Cb, Pro—Jan., 1917. Importance of the work, training needed, etc.

**Car Interchange**

Constructive Suggestions on Car Interchange (80593). 5500 w. Ry Age Gaz—Aug. 17, 1917. Prize winning and three other papers received in a recent contest. How to secure maximum employment of cars in the present emergency.

**Car Pooling**

Box Car Equalization (77030). 2200 w. Ry Age Gaz—March 2, 1917. Principles of car pooling, with suggestions.

**Car Saving**

Save a Car a Day Each Day (82106). A. J. Gibney. 4500 w. Ry Rev—Oct. 27, 1917. Suggestions on railway operation. Better car utilization through loading to capacity, and by more prompt unloading by consignees.

**Claims**

A Successful Campaign on Claim Reduction (81481). Charles E. Parks. Ills. 4000 w. Ry Age Gaz—Sept. 28, 1917. Methods adopted by the Santa Fe and results secured.

**Collisions**

The Railway Collisions at Wigan and Kirtlebridge (77660 A). 2200 w. Engr—March 9, 1917. Facts from Board of Trade report concerning accidents.

**Concessions**

L'Évolution De L'Idée De Concession (77601 C + D). M. Denizet. 4300 w. Pont Chaus Ann—Sept.-Oct., 1916. Evolution of concessions as applied to railways. Review of French practice.

**Co-operation**

Co-operation—One Thing the War Is Teaching Us (82107). George Dallas Dixon. 3000 w. Ry Rev—Oct. 27, 1917. Address at Traffic Club, Philadelphia.

The Pressing Need of Prompt Co-operation (81908). Samuel Rea. 4500 w. Ry Age Gaz—Oct. 19, 1917. Address before Nat. Assn. of R. R. commissioners.

**Drawbridges**

Conferences and Commission Rulings Following Boston Drawbridge Accident (74929). Ills. 4000 w. Elec Ry Jl—Nov. 25, 1916. Commission orders positive stops at drawbridges on Mass. railways.

**Discipline**

Brown's Discipline on American Railroads (79740). 3500 w. Ry Age Gaz—July 6, 1917. Abolition of suspensions for misconduct on four-fifths of the important roads. Effect on the morale of the employees.

**Efficiency**

Improve Railroad Efficiency (79284 A). 1700 w. Ry Mech Engr—June, 1917. Suggestion from circular issued by the Am. Ry. Assn. Special Committee on National Defense.

To Increase Transportation Efficiency (79029). 5000 w. Ry Age Gaz—June 1, 1917. Howard Elliott tells of work being done by railroad board in the present emergency.

**Encampments**

Railroad Efficiency at Army Encampments (81100). Ills. 1200 w. Ry Age Gaz—Sept. 14, 1917. Problems in transportation of material, supplies, and men.

**Engineers**

See same heading under INDUSTRIAL MANAGEMENT, *Education*.

**Expenses**

A Monthly Analysis of Operating Expenses (75735). J. H. Hopkins. 1000 w. Ry Age Gaz—Jan. 5, 1917. Outlines a scheme.

**Food Supply**

Railroads Contribute to Campaign for Food Production (78162). 6500 w. Ry Rev—April 21, 1917. Summary of steps taken for promoting the movement and increasing the nation's resources in foodstuffs.

**France**

Observations—Operation of Transportation Facilities and Manufacturing Activities in the Verdun Region (76158 A). John A. Penton. 25 pp. Ry Cb Pitts, Pro—Nov. 24, 1916.

**Freight Cars**

Wanted—A Freight Car (79381 A). A. M. Schoyer, with discussion. 24 pp. Ry Cb Pitts, Pro—April 27, 1917. Car congestion, the causes and the remedies suggested.

**Fuel**

Suggestions for the Conservation of Fuel (79031). 2000 w. Ry Age Gaz—June 1, 1917. Fuel Assn. recommendations for economy.

**Government Ownership**

Nacionalizacion De Los Ferrocarriles (78257 A). A. De Ximeno. 7200 w. Soc Cub Ing Rv—Mar., 1917. Advantages of government ownership for Cuban railways.

Mr. Acworth on Government Ownership of Railroads Before the Newlands Committee (78617). 1500 w. Ry Rev—May 12, 1917. Unfavorable to government ownership in the United States or Great Britain.

Government Ownership in Foreign Countries (78731). W. M. Acworth. 8000 w. Ry Age Gaz—May 18, 1917. Outlines experiences of state railways.

**Harmful Regulation**

Farmer and Railroad as Partners in Industry (81910). W. B. Storey. From an address at Berkeley, Cal. 4500 w. Ry Age Gaz—Oct. 19, 1917. Essentials of railroad prosperity and troubles affecting it.

**I. C. C.**

I. C. C. Prescribes Partial Code of Car Service Rules (76277). 6500 w. Ry Age Gaz—Jan. 26, 1917. Rules for coal, refrigerator and ventilated cars.

**India**

Canvassing for Traffic in India (75889 A). Jowala Prasad Sinha. 4000 w. Ry Gaz—Dec. 22, 1916. Suggestions.

**Inspection**

Federal Inspection Requirements (81819 A). 2500 w. Ry Mech Engr—Oct., 1917. Abstract of a Committee report of the Gen. Foremen's Assn. Outlines methods followed.

**Interlocking**

Electric Interlocking at Utica, N. Y. (77099). B. A. Lundy. Ills. 3300 w. Ry Sig Engr—March, 1917. A 180-lever N. Y. Central plant.

Mechanical Interlocking (77517 C). Ills. 1500 w. Ry Sig Assn, Jl—March, 1917. Field construction of pipe lines; locking switches mechanically.

Rock Island Signalling on the Chicago Terminal (77096). E. L. Russell. Ills. 3000 w. Ry Sig Engr—March, 1917. Reconstruction of facilities.

The Denver Union Station Interlocking (77100). Leon D. Dickinson. Ills. 3000 w. Ry Sig Engr—March, 1917. Two electric plants installed in reconstruction of terminal.

Réalisation Électrique Des Enclenchements (77594 B). R. Coupan. Ills. 6000 w. Gen Civ—March 3, 1917. Details of new Forestier system of electric interlocking.

Ueber die Sicherung des Zugverkehrs durch elektrische Blockapparate (77552 B). P. Frei. Ills. 3000 w. Schweiz Bau—Feb. 24, 1917. Interlocking signals and train control apparatus on a 6 mile Swiss line, mostly in tunnel. Electric locking employed.

Pacific Electric Terminal Interlocking (78552). Ills. 1000 w. Ry Sig Engr—May, 1917. Electro-pneumatic plant in Los Angeles, Cal.

A New Boston & Albany Installation (79175). George A. Kirley. Ills. 1800 w. Ry Sig Engr—June, 1917. Features of recently completed plant at Pittsfield, Mass.

Electric Interlocking Installed at a Busy Crossing (80187). Ills. 1000 w. Ry Age Gaz—July 27, 1917. Plant at Corinth, about six miles from the Chicago union station.

New Plant in Chicago Terminal District (80344). Ills. 1500 w. Ry Sig Engr—Aug., 1917. Electric interlocking plant for a busy industrial section in Chicago.

New Interlocking Plant in Milwaukee (81045). R. M. Phinney. Ills. 4500 w. Ry Sig Engr—Sept., 1917. Complete electric installation near Allis station.

**Italy**

Italy's New and Better Railroad Organization (75925). Map. 4000 w. Ry Age Gaz—Jan. 12, 1917. Dividing the railroads into two zones has secured better results.

**Legislation**

Taking Railway Law-Making by the Forelock (80222). Howard Elliott. 4000 w. Ry Rev—July 28, 1917. Address before convention of Train Dispatchers' Assn. of America. Urges the duty of presenting the railroads' case publicly.

**Lightning Arresters**

Lightning Protection (77522 C). Ills. 8 pp. Ry Sig Assn, Jl—March, 1917. Measurement of the resistance of grounds for lightning arresters.

**Locomotive Service**

Increase the Service of Available Power (79532 B). Ills. 5500 w. Ry Age Gaz—June 22, 1917. (Special no.) Importance of proper maintenance. Suggestions.

**Military Trains**

New Military Trains—Great Indian Peninsula Railway (75898 A). Ills. 1000 w. Ry Gaz—Dec. 1, 1916. Particulars of the make-up of the train.

**National Service**

Railways Active in the Nation's Service (80312). 2500 w. Ry Age Gaz—Aug. 3, 1917. Various kinds of work for the government.

How the Railways Are Helping Win the War (81480). R. H. Aishton. 4000 w. Ry Age Gaz—Sept. 28, 1917. Record of efficiency under difficult conditions.

**N. Y., N. H. & H.**

New York, New Haven & Hartford (78514). Map. 1000 w. Ry Age Gaz—May 4, 1917. Review of the report for 1916, which is mainly a record of Howard Elliott's work.

**Operation**

Engineering Efficiency in Railway Operation (74266 A). J. C. Thirwall. 2000 w. Gen Elec Rev—Nov., 1916. Constant vigilance necessary to obtain maximum efficiency.

A study in Operation St. Louis and San Francisco (77003 A). Map. 2500 w. Ry Gaz—Feb. 9, 1917. Serial, 1st part. Recent development. Educational methods, etc.

The Operating Side of a Railroad (79058 A). A. J. Stone. Address to the R. R. Men's Imp. Soc. of N. Y. 3000 w. Ry & Loco Eng—June, 1917. Serial, 1st part. Requires experience, self-confidence, judgment, and an assumption of responsibility.

Electricity as an Aid to Railroad Operation (79541 B). Ills. 3500 w. Ry Age Gaz—June 22, 1917. (Special no.) Ways by which it may contribute to increased efficiency and capacity.

**Paris**

Paris as a Military Railway Centre (77410 A). 1800 w. Ry Gaz—March 2, 1917. Example of proper organization for coöperation in war time.

**Passenger Trains**

Passenger Train Economy Without Impairing Service (79555 B). 2500 w. Ry Age Gaz—June 22, 1917. (Special Number). Duplication of service should be reduced.

**Railroad Duty**

The Patriotic Duty of the Railroad Man (81009). Daniel Willard. 4000 w. Ry Rev—Sept. 8, 1917. Extracts from address on the patriotic service of the railroads and business interests to help win the war.

**Railroad Problems**

National Association of Railway Commissioners (81911). Max Thelen. 4000 w. Ry Age Gaz—Oct. 19, 1917. Presidential address discussing railroad problems and the duty of commissioners in war time.

What the Railroads Are Doing to Win the War (81886). Richard H. Aishton, with discussion. Also introductory remarks by B. F. Bush. 20 pp. St L Ry Cb, Pro—Sept. 14, 1917. The war organization and what it has accomplished.

**R. R. War Board**

What the Railroads' War Board Has Accomplished (81103). 2000 w. Ry Age Gaz—Sept. 14, 1917. Summary of its accomplishments.

**Railway Conditions**

Some of the Conditions Which the Railroads Face (77028). A. J. County. 3000 w. Ry Age Gaz—March 2, 1917. Barriers to railroad preparedness; regulation, etc.

**Railway Earnings**

The Trend of Railway Earnings in the Year 1916 (75508). Julius H. Parmelee. 3000 w. Ry Age Gaz—Dec. 29, 1916. A record-breaking year.

**Railway Failures**

The Classification of Railway Failures (75229 A). 3000 w. Engng—Nov. 24, 1916. Failures cannot be compared owing to varying conditions, such as location, traffic, etc.

**Railway Problems**

Nationalize C. N. R., Lend $7,500,000 to G. T. P. (80471). 2200 w. Can Engr—Aug. 9, 1917. Canadian Government's temporary solution of the railway problem.

**Railway Resources**

Conservation of Railway Resources (78492 A). A. H. Armstrong. Abstract of lecture at Mass. Inst. Tech. 2200 w. Gen Elec Rev—May, 1917. Means of increasing the capacity of the railroads. Favors electrification.

**Railways**

The Railway Situation at Close of Year 1916 (75502). 4200 w. Ry Age Gaz—Dec. 29, 1916. Resemblance and contrasts with conditions ten years ago. The attitude of the public.

The Railway Problem (76151). Frederic A. Delano. Extracts from an address in N. Y. City, Jan. 16. 4500 w. Ry Rev—Jan. 20, 1917. Unsatisfactory situation due to misapprehensions.

**Railway War Service**

Railways at the Service of the Government (77987). 2500 w. Ry Age Gaz—April 13, 1917. Plans for co-ordination of activities. Will be operated as a unit.

**Resistance**

Analysis of Steam Train Resistance (76368 A). H. A. Houston. 4000 w. Ry Gaz—Jan. 12, 1917.

Passenger Train Resistance (77297 C). Edward C. Schmidt and Harold H. Dunn. 12 pp. A R E A—Feb., 1917. Appendix A.

**Review of 1916**

Traffic and Locomotive Developments (76926). 2000 w. Times Eng Supp—Jan. 26, 1917. Review of British developments.

**Salvage**

Railway Scrap or Salvage (75736). E. J. McVeigh. From a paper before the Can. Ry Club. 1500 w. Ry Age Gaz—Jan. 5, 1917. Suggestions for the handling of scrap.

**Signal Association**

Meeting of Railway Signal Association, Held at Hotel McAlpin, New York City (81255 C). Ills. 200 pp. Ry Sig Assn, Jl—Sept., 1917. Committee reports and discussions at meeting of June 12-13, 1917.

**Signaling**

Power Signaling Near Sydney, Australia (75208). C. V. Byles. Ills. 2000 w. Ry Sig Engr—Dec., 1916. Junctions on New South Wales Rys. operated by electric plant.

The Rotary Interlocking Block System (75225 A). Ills. 4500 w. Ry Gaz—Nov. 24, 1916. Detailed description.

The Economical Signalling of a Colonial Railway (75449 A). A. C. Rose. Ills. 2000 w. Ry Engr—Dec., 1916. Read before Inst. of Ry. Sig. Engrs. Ills. London. Conditions and methods.

The Economical Signalling of a Colonial Railway (74989 A). A. C. Rose. Read before Inst. of Ry. Sig. Engrs. Ills 2000 w. Ry Gaz—Nov. 10, 1916. Outlines conditions and methods.

Railway Signaling (76032 N). C. E. Denney, with discussion. 8000 w. N E Rd Cb—Dec. 12, 1916. Systems and their operation.

Die Druckluft-Stellwerkanlage des Bahnhofes Spiez (76219 B). W. Schaffer. Ills. 2300 w. Serial, 1st part. Schweiz Bau—Dec. 9, 1916. Pneumatic block and interlocking signal installation at Spiez, Switzerland.

Power Signalling Installation at Flemington, New South Wales Railways (75890 A). Ills. 2200 w. Ry Gaz—Dec. 22, 1916. Detailed description.

Summary of Signaling in the Past Year (75836). 9 pp. Ry Sig Engr—Jan., 1917. Record of protection installed and proposed, with conditions.

Report of Committee X—On Signals and Interlocking (76562 C). Ills. 78 pp. Am Ry Eng Assn, Bul—Dec., 1916.

Obeying the Distant Signal (76805). A. G. Shaver. 2500 w. Ry Rev—Feb. 17, 1917. Existing practice and Mr. Belnap's proposal.

The Dallas Union Terminal Interlocking (76502). G. K. Thomas. Ills. 2000 w. Ry Sig Engr—Feb., 1917. Two electro-pneumatic plants at station used by seven roads.

Signaling a Single-Track Bridge Line (76503). B. Wheelwright. 1600 w. Ry Sig Engr—Feb., 1917. Protection for a busy crossing of the St. Lawrence River.

The Value of Signalling (76693 A). 2500 w. Ry Gaz—Jan. 26, 1917. Abstract of a discussion from report of Nat. Assn. of Ry. Com.

Direct Current Relays (77520 C). 6 pp. Ry Sig Assn, Jl—March, 1917. Windings of relay coils; recommended resistance of track relays, etc.

Automatic Signalling (77646 A). Charles H. Ellison. Read before Instn. of Ry. Sig. Engrs. Ills. 5000 w. Ry Gaz—March 9, 1917. Serial, 1st part. History of development and application in England.

The Application of the Oscillograph (77098). C. R. Beall. Ills. 2200 w. Ry Sig Engr—March, 1917. Details of instrument and its use in signal apparatus.

Maintenance and Operation (77518 C). 2500 w. Ry Sig Assn,Jl—March, 1917. Maintenance of alkaline storage batteries; new developments in manual block signaling, etc.

Organization for Signal Maintenance (77097). James Anderson. 2500 w. Ry Sig Engr—March, 1917. Plans for fixing authority and arranging work.

Power Signalling Installation at Flemington: New South Wales Government Railways (77409 A). Ills. 2000 w. Ry Engr—March, 1917. Details of a large and interesting installation.

Route, Section or Track Locking (77005 A). 3000 w. Ry Engr—Feb., 1917. Modern developments in railway signalling.

Signalling Practice (77516 C). 8 pp. Ry Sig Assn, Jl—March, 1917. Problem of signaling single track roads, methods of giving signal indications, etc.

Harmonizing of Specifications (77523 C). 17 pp. Ry Sig Assn, Jl—March, 1917. Harmonizing of detail provisions, drawings, etc.

Storage Battery and Charging Equipment (77521 C). 7 pp. Ry Sig Assn, Jl—March, 1917. General specifications for switchboards.

Standard Designs (77519 C). Ills. 15 pp. Ry Sig Assn, Jl—March, 1917. Revised drawings, and new drawings.

"Hold Main" Signals Installed by L. & N. (77898). F. H. Bagley. Ills. 1500 w. Ry Sig Engr—April, 1917. Dispatchers 53 miles away can indicate to trains when not to take siding.

The "Chalmers-Black" Non-Accumulative Visual Indicator for Shaft-Signalling (78236 N). John B. Thomson. Ills. 1200 w. Instn Min Engrs, Trans—March, 1917. Detailed description.

New Automatic Signals on the C. G. W. (77899). W. J. Mullins. Ills. 900 w. Ry Sig Engr—April, 1917. Extension of protection on 107 miles.

Increasing Track Capacity by Signaling (79547 B). 6000 w. Ry Age Gaz—June 22, 1917. (Special no.) Improved time by modern signaling and interlocking devices.

Two New Illinois Central Installations (79176). R. C. Bingham and C. E. Earhart. Ills. 2500 w. Ry Sig Engr—June, 1917. Only 34 miles on Chicago-New Orleans line unsignaled.

Operating Men Discuss Use of the Overlap (80452). 4500 w. Ry Age Gaz

—Aug. 10, 1917. Two stop or two caution signals behind trains not generally favored.

Better Signal Department Organization (81046). The Signal Engineer. A. G. Shaver. 1500 w. Ry Sig Engr—Sept., 1917. Serial, 1st part. First article of a series on various phases of organization.

Light Signals on C. M. & St. P. (81044). L. B. Porter. Ills. 4000 w. Ry Sig Engr—Sept., 1917. Details of a new a. c. installation on 440 miles of single track main line.

Position-Light Signals for Railroad Service (81149 C). A. H. Rudd, with discussion. 3000 w. Ill Eng Soc, Trans —Aug. 30, 1917. Systems of railway signals and their development.

**Signals**

Designing Battery Charging Line (74446). H. D. W. Riley. 3000 w. Ry Sig Engr—Nov., 1916. Synopsis of methods followed, with comparison of different arrangements of equipment.

Position-Light Signals on the Pennsylvania R. R. (74509). Ills. 1300 w. Eng News—Nov. 9, 1916. New system in use on electrically operated division.

Special Protection for a Drawbridge (74384). Ills. 1000 w. Ry Age Gaz—Nov. 3, 1916. Automatic signal and interlocking protection at the government drawbridge at Rock Island, Ill.

The Psychology of the Stop Signal (74378 A). 3000 w. Ry & Loco Eng—Nov., 1916. Imperfect perception; power of suggestion; automatic stops.

A. C. Signals on the N. & W. (78551). J. A. Beoddy. Ills. 1800 w. Ry Sig Engr—May, 1917 Automatics on two single-track lines, also a. c. electric interlocking plants.

Southern Proves Value of A. C. Signals (81646). Ills. 1800 w. Ry Sig Engr—Oct., 1917. Nearly 700 miles of double-track protection installed during the last five years.

**Speed Restrictions**

Unreasonable Speed Restrictions Place Enormous Burden on Railway Operation (81672). T. J. Foley. 1200 w. Ry Rev —Oct. 6, 1917. From a bulletin directed to trainmen and enginemen.

**Stephenson**

Stephenson and Transportation (78690 N). F. E. Stanley, with discussion. 45 pp. N E Rd Cb—Apr. 10, 1917. Biographical sketch of Stephenson and his work.

**Store Department**

Conservation of Railway Equipment (77766). Ills. 2500 w. Ry Rev—March 31, 1917. Analysis of the relation of the store department to the present traffic situation.

Relation Between Mechanical and Stores Departments (77903). H. D. Wolcomb. 2500 w. Ry Rev—April 7, 1917. Deprecates the often existing friction between these departments.

**Supply Trains**

Economics of the Supply Train (79164). D. D. Cain. 1800 w. Ry Rev—June 9, 1917. Savings effected on the Seaboard Air Line.

**Swing Bridge**

Neath River Swing Bridge (76780 N). A. W. M. Dyke. Ills. 1500 w. Per. Way Instn—Dec., 1916. Signalling arrangements for trains passing over.

**Switzerland**

The Sufferings of Swiss Railways (75887 A). 1500 w. Ry Gaz—Dec. 22, 1916. Effects of the war.

Swiss Railways in War Time (77173 A). 1500 w. Engr—Feb. 16, 1917. Disastrous effects on traffic.

**Telephone Dispatching**

See same heading under ELECTRICAL ENGINEERING, *Communication.*

**Timber Handling**

Centralizing the Handling of Timber on the B. & O. (79625). F. J. Angier. 1500 w. Ry Age Gaz—June 29, 1917. Inspection, storing, treatment, and distribution of ties and lumber.

**Track Circuits**

Simple Track Circuit Calculations (74447). Henry Bezer. 1600 w. Ry Sig Engr—Nov., 1916. Analysis.

D. C. Track-Circuits (79468 A). 2500 w. Ry Engr—June, 1917. Method of ascertaining the various values.

**Traffic Density**

Potenzialita Di Una Linea Ferroviaria (76900 C). F. Corini. 4200 w. Ingeg Ferro—Dec. 15, 1916. Capacity of a railway line, single and double track, in terms of distance, speed, etc. Mathematical.

**Traffic Regulation**

See Railway Regulation, under INDUSTRIAL MANAGEMENT, *Regulation.*

**Train Control**

The Kiesel Train Resistance Formulas (75274 A). A. J. Wood. 500 w. Ry Mech Engr—Dec., 1916. Method and its application.

Train Control on the Great Indian Peninsula Railway (77165 A). Ills. 1500 w. Ry Gaz—Feb. 16, 1917. Telephone train control system.

Automatic Train Control (78283). 1500 w. Times Eng Supp—Mar. 30, 1917. Influence of recent accidents on design of apparatus.

The Julian-Beggs Automatic Stop and

Train Control System (78929). Ills. 1800 w. Ry Rev—May 26, 1917. Test of an installation on the Cin., N. Orleans & Tex. Pacific R. R.

Wooding Automatic Stop Signal and Speed Control (78442 A). Ills. 2000 w. Ry & Loco Eng—May, 1917. Apparatus, and how it operates.

Train Handling (79165). G. H. Wood. 2200 w. Ry Rev—June 9, 1917. The relation of piston travel to facility of train handling. Advocates a longer travel.

Automatic Train Control (80406 A). Ills. 2500 w. Engr—July 20, 1917. General remarks, with description of the G. E. R. system of automatic train control for Westinghouse brake.

**Train Dispatching**

Train Rules and Train Dispatching, Past and Present (74609 A). John F. Mackie. 3500 w. Cen Ry Cb, Pro—Oct. 17, 1916. Brief historical review with critical discussion of rules.

Modern Train Despatching — Some Needed Forms (79107). Harry W. Forman. 4000 w. Ry Age Gaz—June 8, 1917. A study of the despatcher's language problems.

**Train Loads**

Methods of Increasing the Train Load (79542 B). 5000 w. Ry Age Gaz—June 22, 1917. (Special no.). Papers by different authors on this subject.

**Trains**

Express Passenger Train with Armored Coaches—Great Central Railway (74561 A). Ills. 400 w. Ry Gaz—Oct. 27, 1916. Train in London-Manchester service.

Train Handling (81002). G. H. Wood. From paper before Car Foremen's Assn. 1600 w. Ry Age Gaz—Sept. 7, 1917. How to prevent shocks in long trains.

**Train Service**

Possibilities of a Market-Train Service (80682). Abstract of a bulletin of U. S. Dept. Agri. G. C. White and T. F. Powell. 4000 w. Ry Age Gaz—Aug. 24, 1917. Designed to aid small producers and city consumers, and to operate on short distances.

**Train Stop**

The Webb Automatic Train Stop (77989). Ills. 2000 w. Ry Age Gaz—April 13, 1917. Under test on the N. Y., N. H. & H. R. R.

Wording's Automatic Train-Stop (81104). Ills. 2200 w. Ry Age Gaz—Sept. 14, 1917. A spring-supported contact rail, made movable to break ice.

**Transportation**

Ferrovie Di Stato E Ministero Dei Trasporti (75555 C). E. D'Agostino. 8600 w. Ingeg Ferro—Nov. 15, 1916. State railways and the function and activities of the Minister of Transportation in Italy.

Some of the Very Pressing Transportation Problems (75734). Winthrop M. Daniels. 2500 w. Ry Age Gaz—Jan. 5, 1917. Causes of congestion, wage disputes, etc.

The True Relation of Shippers to the Transportation Problem (75672). E. B. Leigh. Ills. 2500 w. Ry Rev—Dec. 30, 1916. Abstract of address at Evansville, Ind. Stable rates more important than low rates.

Sulla Politica Nazionale Dei Trasporti (80001 B). 2400 w. Mon Tec—May 20, 1917. Review of transportation facilities controlled by the Italian government: shipping, internal waterways, etc.

**Wales**

Co-ordination Among Welsh Railways (81096 A). Map. 1500 w. Engr—Aug. 31, 1917. Particulars of changes in management to improve service.

**War Board**

The Railroads' War Board (79622). 1500 w. Ry Age Gaz—June 29, 1917. The work of the Board.

The Railroads' War Board (80592). Edgar E. Clark. 1800 w. Ry Age Gaz—Aug. 17, 1917. Remarks at a conference of the Special Committee on National Defense.

Carrying the Selected Men to Camp Devens (82068). Ills. 2500 w. Ry Age Gaz—Oct. 26, 1917. Service of the Boston & Maine.

**War Tax**

Instructions for Applying War Tax (82069). 4000 w. Ry Age Gaz—Oct. 26, 1917. Instructions as to the application of the new war tax to the transportation of property and persons.

# MOTIVE POWER AND EQUIPMENT

**Air Brakes**

Improvements in Brakes for Passenger Cars (75078 A). 1000 w. Ry & Loco Eng—Dec., 1916. Air-brake problems.

Cleaning and Lubrication of Triple Valves (75076 A). W. V. Turner. 1500 w. Ry & Loco Eng—Dec., 1916. From the viewpoint of an air-brake man.

The Universal Control Equipment (75077 A). Ills. 1800 w. Ry & Loco Eng—Dec., 1916. Serial, 1st part. Construction and operation.

Comparative Compressed Air Consumption of the Empty and Load and the Single Capacity Brake (75841 A). Walter V. Turner. 1500 w. Ry & Loco Engr—Jan., 1917.

The Universal Valve of the U. C. Brake Equipment (75838 A). Ills. 2000 w. Ry & Loco Eng—Jan., 1917. Construction.

Operation of the Universal Valve (76532 A). 1800 w. Ry & Loco Eng—Feb., 1917. Operation in charging the reservoirs and during a service application of the brakes.

Train Line Maintenance (76828). A. McCowan. Abstract of paper before Car Foreman's Assn. 2500 w. Ry Age Gaz—Feb. 23, 1917. Deals mainly with air brake defects.

The Maintenance of Air Brakes on Freight Car Equipment (76575 N). H. S. Walton, with discussion. 9500 w. N E R R Cb—Jan. 9, 1917. Inspection and maintenance methods.

Operation of the Universal Valve in Emergency and Graduated Release Positions (77113 A). Ills. 2000 w. Ry & Loco Eng—March, 1917. Explanatory.

Train Line Maintenance (77081). A. McCowan. Ills. 2500 w. Ry Rev—March 3, 1917. Abstract of paper read before the Car Foremen's Assn. of Chicago. The air-brake hose problem, and its bearing on train operation.

The Value of an Efficient Air Brake (77115 A). Walter V. Turner. 1200 w. Ry & Loco Eng—March, 1917. Importance of adequate control of trains.

The Air Brake as an Insurance Against Accident (77751 A). Walter V. Turner. 1200 w. Ry & Loco Eng—April, 1917. Present stage of railway science.

The Universal Valve (77748 A). Ills. 2500 w. Ry & Loco Eng—April, 1917. Some defects; variations in the emergency features.

Convention of the Air Brake Association (78525). 7000 w. Ry Rev—May 5, 1917. Serial, 1st part. Proceedings, abstracts of papers, etc.

Air Brake Lever Computations (78548 A). Lewis K. Sillcox. From a paper at Car Foremen's Assn. 600 w. Ry Mech Engr—May, 1917. Methods for calculating braking force explained.

The Universal Valve Test Rack (78445 A). Ills. 3500 w. Ry & Loco Eng—May, 1917. Details, with code of tests.

The Functional Inter-Relation of Parts in the Air Brake System (79037). W. E. Dean. Abstract of paper read before the Air Brake Assn. Ills. 3000 w. Ry Rev—June 2, 1917. The related functions.

Electric Operation of the Universal Valve (79711 A). Ills. 2200 w. Ry & Loco Eng—July, 1917. Explanatory.

An Up-to-Date Course in Air Brake Study (80343 A). 5500 w. Ry & Loc Eng—Aug., 1917. Serial, 1st part. Air brake questions and answers.

Train Line Maintenance (80339 A). 2200 w. Ry & Loc Eng—Aug., 1917. Defective hose and loose and broken train pipes. A possible remedy. From paper by A. McGowan read at Chicago.

Automatic Straight Air Brake System (81912). Ills. 2500 w. Ry Age Gaz—Oct. 19, 1917. Design and operation of a new triple valve for passenger and freight equipment.

Air Brake Equipment for Modern Electric Locomotives (81624). W. E. Dean, Jr. Ills. 1000 w. Elec Jl—Oct., 1917. Details of present equipment.

The Relation of Air Compressor Capacity to Brake Pipe Leakage (81923 A). C. H. Weaver, with discussion. 50 pp. Cent Ry Cb, Pro—Sept., 1917. Tests, methods of conducting them, and results.

Regenerative Braking (81611). Walter V. Turner. Ills. 1500 w. Elec Jl—Oct., 1917. Its value in giving safety and economy.

Brake Pipe Leakage and Compressor Capacity (81483). C. R. Weaver. 2000 w. Ry Age Gaz—Sept. 28, 1917. Methods of testing train leakage.

Poorly Designed Foundation Brake Rigging and Slid Flat Wheels (81545 A). Walter V. Turner. Ills. 1500 w. Ry & Loc Eng—Oct., 1917. The requisites of foundation brake rigging.

**Ambulance Trains**

Ambulance Trains from Civil War to Present (79551 B). Ills. 4000 w. Ry Age Gaz—June 22, 1917. (Special no.) First used in the United States in 1863. Trains in England and France described.

**Auxiliary Equipment**

The Auxiliary Equipment of the Chicago, Milwaukee and St. Paul Locomotives (74251 A). L. W. Webb. Ills. 1500 w. Gen Elec Rev—Nov., 1916. Lightning arresters, voltmeters, watt-hour meters, compressor circuits, motor-generator circuits, cab heaters, headlights and train lighting apparatus.

**Back Pressure**

La Contre Vapeur, Son Emploi Actuel (80753 B). 6400 w. Gen Civ—Aug. 11, 1917. The use of back pressure steam for holding trains while descending grades. Practice of French railways.

**Bearings**

Side Bearing Location (80421 A). Lewis K. Sillcox. Ills. 1200 w. Ry Mech Engr—Aug., 1917. Proper location, loading, etc.

**Boiler Patches**

Boiler Patches for Locomotives (78549). M. J. Cairns. Ills. 1800 w. Ry Mech Engr—May, 1917. Strength of the diagonal seam compared with the longitudinal seam.

**Boiler Water**

Handling Locomotives Using Foamy Boiler Water (79791). L. F. Wilson. 1000 w. Ry Rev—July 7, 1917. How best results in the use of anti-foaming compound can be obtained.

**Brakes**

Clasp Brakes for Heavy Passenger Equipment Cars (74320 A). T. L. Burton. Abstract. 3000 w. A S M E, Jl—Nov., 1916. Advantages stated.

Empty and Load Brake in Grade Service (74379 A). W. V. Turner. 1200 w. Ry & Loco Eng—Nov., 1916. Its improvements and advantages.

Triple Valve Maintenance (74381 A). 1500 w. Ry & Loco Eng—Nov., 1916. Importance of accurate repairs.

See also MECHANICAL ENGINEERING, *Automobiles.*

**Brick Arches**

Pennsylvania Locomotive Brick Arch Tests (78515). 2000 w. Ry Age Gaz—May 4, 1917. Shows that fuel is saved and steaming capacity increased.

Brick Arch Tests, Pennsylvania Railroad (80319). 1500 w. Ry Rev—Aug. 4, 1917. Résumé of tests to show value of brick arch in conserving fuel, or increasing output.

**Car Design**

The Economics of Car Design (81815 A). John A. Pilcher. 2500 w. Ry Mech Engr—Oct., 1917. Why railroads should do their own designing; cost and cost of operation.

**Car Door**

The Veco Flush Car Door (76533 A). Ills. 1500 w. Ry & Loco Eng—Feb., 1917. Detailed description.

**Car Dumpers**

Rovesciatori Di Carri (76902 C). U. Leonesi. Ills. 5200 w. Ingeg Ferro—Jan. 15, 1917. Serial, 1st part. Car unloaders of various types as built in Great Britain and Europe.

**Car Lighting**

Efficient and Economical Railway Car Lighting (80913 A). 2500 w. Ry & Loco Eng—Sept., 1917. From paper by George Hulse. New methods applied.

**Car Painting**

Passenger Car Painting and Varnishing (77254). Thomas Marshall. 2200 w. Ry Rev—March 10, 1917. Read before Can. Ry. Club. Methods of 20 years ago and of the present.

**Car Repairs**

Cars Must Be Kept in Serviceable Condition (79548 B). 2500 w. Ry Age Gaz—June 22, 1917. (Special no.). Thorough repairs important.

**Cars**

All-Steel Railway Coaches for India (74577 A). Ills. 1500 w. Engr—Oct. 27, 1916. Detailed description.

Third-Class All-Steel Carriages for the Egyptian State Railways (74573 A). Ills. 700 w. Engng—Oct. 27, 1916. Particulars and advantages.

Truss-Side Construction for Railway Cars (74931). L. B. Stillwell. Abstract of paper before Cent. Elec. Ry. Assn. Ills. 2200 w. Elec Ry Jl—Nov. 25, 1916. Outlines reasons for truss-side designs for steel cars and action of car framing in collisions.

Automatic Refrigerator and Heater Car (75276 A). Ills. 1800 w. Ry Mech Engr—Dec., 1916. Uses the ammonia absorption system.

Analyzing a Typical Freight Car Journey (75446). C. F. Balch. 2500 w. Ry Age Gaz—Dec. 22, 1916. Study of reasons for low mileage and the remedy.

Hopper Car of 200,000-lb. Capacity (75275 A). Ills. 1200 w. Ry Mech Engr—Dec., 1916. Car built for the Woodward Iron Co., Woodward, Ala.

New Passenger Rolling Stock—Great Southern & Western Railway (75128 A). Ills. 800 w. Ry Gaz—Nov. 17, 1916. Detailed descriptions.

Sleeping Cars for the Canadian Government (75150). Ills. 1500 w. Ry Age Gaz—Dec. 8, 1916. Construction of steel except part of interior finish.

Pennsylvania Railroad Refrigerator Cars (76480). Ills. 900 w. Ry Age Gaz—Feb. 2, 1917. Cars designed for transportation of milk and cream.

Freight Car Repair Problems (76518). Lewis K Sillcox. Ills. 4000 w. Ry Rev—Feb. 3, 1917. Beneficial practices in correcting weaknesses.

Steel Passenger Cars for the Burlington (76827). Ills. 1000 w. Ry Age Gaz—Feb. 23, 1917. Features in lighting, floor construction and roof fastenings.

Steel Passenger Cars for D. & H. (76537 A). Ills. 1000 w. Ry Mech Engr—Feb., 1917. Two designs of coaches.

All Steel Passenger Cars for the Chicago, Burlington & Quincy (77136 A). Ills. 1000 w. Ry Mech Engr—March, 1917. Interesting features.

Betts Combination Stock and Coal Car (77374). Ills. 1000 w. Ry Age Gaz—March 16, 1917. Details of design.

Canadian Government Sleeping Cars (77002 A). Ills. 1500 w. Ry Gaz—Feb. 9, 1917. Detailed description.

Eighty-Five Ton Hopper Car for the Pennsylvania (77185). Ills. 1200 w. Ry Age Gaz—March 9, 1917. All-steel car.

Experimental Refrigerator Cars on Pennsylvania R. R. (77111 A). Ills.

1000 w. Ry & Loco Eng—March, 1917. Latest form of refrigerator construction.

57 ft. Bogie Corridor 3rd-Class and Tri-Composite Carriages and Dining Saloons, Great Southern and Western Railway of Ireland (77408 A). Ills. 7000 w. Ry Engr—March, 1917. Detailed description.

Freight-Car Equipment of the Missouri, Kansas and Texas Ry. (77082). J. W. Kendrick. 3000 w. Ry Rev—March 3, 1917. Abstract of report. Methods of keeping records of repair costs, etc.

Freight-Car Repair Problems (77135 A). Lewis K. Sillcox. Abstract of paper before the Car Foremen's Assn. of Chicago. Ills. 1800 w. Ry Mech Engr—March, 1917. Study of failures and methods of repairing.

Use of Privately-Owned Wagons for the Conveyance of Goods Traffic (77243 A). 1000 w. Ry Gaz—Feb. 23, 1917. Solution of the empty haulage problem.

Steel Hopper Cars for the Pennsylvania Railroad (77746 A). Ills. 1800 w. Ry & Loco Eng—April, 1917. A 70-ton steel gondola, and an 85-ton high-side hopper-bottom steel gondola.

A 120-Tons Capacity Gondola Car for the Virginian Railway (78522). Ills. 1200 w. Ry Rev—May 5, 1917. First of four experimental cars for possible use in connection with triplex locomotives in handling coal trains.

Refrigerator Cars for the Pacific Fruit Express Co. (78926). Ills. 800 w. Ry Rev—May 26, 1917. New design for transporting perishable commodities.

Lubrication of Freight Cars in Interchange (78732). T. J. Burns. Read before Cent. Ry. Club. 1200 w. Ry Age Gaz—May 18, 1917. Urges periodic reoiling and repacking.

Rules for the Mobilization of Freight Cars (78519). 2500 w. Ry Age Gaz—May 4, 1917. Preferential service for coal and ore; revised regulations for car distribution.

Main Line Steel Passenger Cars for the Erie (79621). Ills. 1500 w. Ry Age Gaz—June 29, 1917. Design marked by light weight and strength.

French Box Cars Built in America (80420 A). Ills. 2200 w. Ry Mech Engr—Aug., 1917. Details of 24,800 lb. capacity cars.

Évolution Nécessaire Dans Le Matériel Des Chemins De Fer (80707 B). D. Bellet. 5300 w. Rev Gen Sci—July 31, 1917. Recognition of the need of steel cars on French railways. Examples of American practice and experience. Suggestions for France.

Settlement for Cars Destroyed on Foreign Lines (80223). E. F. Givin. 1200 w. Ry Rev—July 28, 1917. Scheme for settlement based on the economic value of the car.

A 120-Ton Coal Car for the Virginian (80594). B. W. Kadel. Ills. 1400 w. Ry Age Gaz—Aug. 17, 1917. One of four experimental cars built without drop doors.

Cars in Use Behind the Trenches (81055 A). Ills. 1800 w. Ry Mech Engr—Sept., 1917. A flexible arrangement of narrow gauge trucks.

Freight Car Maintenance (81816 A). Lewis K. Sillcox. Ills. 4000 w. Ry Mech Engr—Oct., 1917. Weaknesses of steel cars; car repair cost, maintenance, etc.

Steel Supply Cars, Norfolk & Western Railway (81671). Ills. 900 w. Ry Rev—Oct. 6, 1917. Design of car for local distribution of oil and other supplies to agents and section gangs.

**Car Wheels**

The Chilled Iron Car Wheel (76756). George W. Lyndon. 2000 w. Ry Age Gaz—Feb. 16, 1917. Value of the chilled iron wheel in transportation.

The Evolution of the Chilled Iron Wheel (78687 A). F. O. Bunnell, with discussion. 25 pp. S & S W Ry Cb, Pro—March, 1917. History of development.

**Conduction Motors**

The Transformer Conduction Motors Used on the Pennsylvania Railroad Trunk Line Electrification at Philadelphia (81612). R. E. Hellmund. Ills. 4000 w. Elec Jl—Oct., 1917. The fundamental principles of the main motor and its control.

**Coning Wheel Treads**

Uber die störenden Nebenbewegungen der Eisenbahn-Fahrzeuge mit Berücksichtigung des Einflusses der Radreifen-Konizität (80010 B). U. R. Ruegger. Ills. 3700 w. Schweiz Bau—June 16, 1917. Serial, 1st part. Effect of conicity of wheel treads on side play. Mathematical treatment.

See also Rails under *Permanent Way and Buildings.*

**Counterbalancing**

Counterbalancing the Reciprocating and Revolving Parts of Locomotives (77744 A). Ills. 2000 w. Ry & Loco Eng—April, 1917. Old and new methods; location of the weights.

Rules and Instructions Governing the Application of Counterbalance to Locomotives, Southern Pacific Co. (74424). Ills. 1200 w. Ry Rev—Nov. 4, 1916. Principles followed and results.

Some Aspects of Countrebalancing (80911 A). Ills. 2000 w. Ry & Loco

Eng—Sept., 1917. Difficulties in balancing the reciprocating parts.

**Crank Axles**

Stresses in Locomotive Crank Axles (75974 A). Ills. 2500 w. Ry Gaz—Dec. 29, 1916. Study of the bending and twisting stresses and troubles with crank axles.

**Cylinder Heads**

Beanspruchung eines Lokomotiv-Dampfzylinder-Deckels (80704 B). H. Keller. Ills. 2000 w. Serial, 1st part. Schweiz Bau—July 7, 1917. Calculation of the strains in locomotive cylinder heads under different conditions of pressure, size, etc.

**Demonstration Trains**

Great Eastern Railway Egg and Poultry Demonstration Train (74301 A). Ills. 500 w. Ry Gaz—Oct. 13, 1916. Train with the object of developing this industry.

**Drop-Forging**

Drop-Forging at Crewe Locomotive Works, London & North-Western Railway (77647 A). Ills. 3000 w. Ry Gaz—March 9, 1917. Serial, 1st part. Drop-forging as applied to railway shops.

**Dynamometer Cars**

Southern Railway, U. S. A., High-Capacity Dynamometer Cars (74478 A). Ills. 1500 w. Ry Gaz—Oct. 20, 1916. Detailed description of car and equipment.

Dynamometer Car for the Nashville, Chattanooga & St. Louis Ry. (80320). Ills. 2200 w. Ry Rev—Aug. 4, 1917. Latest high capacity dynamometer car; Operating on the hydraulic principle. Results obtained.

**Electrical Maintenance**

Three Electricians for Twenty-eight 2400-Volt D. C. Locomotives (81915). 1000 w. Elec Ry Jl—Oct. 20, 1917. Experience of the Butte, Anaconda & Pacific Ry. under arduous conditions.

**Electric Locomotives**

Mechanical Design of Electric Locomotives (74319 A). A. F. Batchelder. Abstract. 1800 w. A S M E, Jl—Nov., 1916. Considers nine important features.

The Mechanical Features of the Locomotives of the Chicago, Milwaukee & St. Paul Main Line Service (74248 A). A. F. Batchelder. Ills. 1500 w. Gen Elec Rev—Nov., 1916. Frames and superstructure, and arrangement of apparatus.

The Operation of Locomotives in Service on the Chicago, Milwaukee & St. Paul Railway (74252 A). W. S. H. Hamilton. Ills. 6000 w. Gen Elec Rev—Nov., 1916. Details concerning the actual handling of trains.

Gears and Side Rods in Electric Locomotives on American Railroads (75154 A). G. M. Eaton, with discussion. Ills. 38 pp. West Ry Cb, Pro—Oct. 16, 1916. Types discussed.

Mechanical Design of Electric Locomotives (75733). 1500 w. Ry Age Gaz—Jan. 5, 1917. Discussion of A. F. Batchelder's paper before the A. S. M. E.

The Maintenance of Electric Locomotives (76276). Ills. 3500 w. Ry Age Gaz—Jan. 26, 1917. Method used on the New Haven lines.

Knocking Down a 120-Ton Electric Locomotive for Export (77138 A). W. D. Bearce. Ills. 1500 w. Gen Elec Rev—March, 1917. Procedure in tearing down and shipping to facilitate handling a locomotive for Chile, S. A.

Mechanical Design of Electric Locomotives (76996 A). 5000 w. A S M E, Jl—March, 1917. Discussion of A. F. Batchelder's paper.

Export Shipment of Heavy Electric Locomotives (77767). Ills. 1600 w. Ry Rev—March 31, 1917. Three locomotives built for Chile, and their trial and shipment.

Novel Locomotive for the Pennsylvania (79208). Ills. 1200 w. Elec Ry Jl—June 9, 1917. Latest type, built for trial service.

The Pennsylvania's New Electric Locomotive (79108). Ills. 1200 w. Ry Age Gaz—June 8, 1917. Features of a new design for high voltage A.C.

Pennsylvania Electric Locomotive (79890 A). Ills. 1200 w. Ry Mech Engr—July, 1917. Experimental design for heavy service.

The New High-Speed Three-Phase Locomotives of the Italian State Railways (79570 A). P. Verole and B. Marsili. Abstract from *Revista Tec. delle Fer Ital.* Ills. 3500 w. Elec'n—June 8, 1917. The mechanical construction, electrical equipment, etc.

The Electric Locomotive (81198 N). Frederick William Carter, with abstract of discussion. Ills. 80 pp. Instn C E, No. 4176—Jan. 11, 1916. The development, methods of driving, running gear, tractive resistance, etc.

Growth in Locomotive Capacity and Reliability (81623). J. V. Dobson. 2000 w. Elec Jl—Oct., 1917. Reviews the development and the record for reliable service, etc.

New Passenger Locomotives for the New Haven Railroad (81620). H. K. Hardcastle. Ills. 1200 w. Elec Jl—Oct., 1917. Details of design and increase in capacity.

New P. R. R. Locomotive Has Powerful Electrical Equipment (81632). Ills. 2500 w. Elec Ry Jl—Oct. 6, 1917. Details of the electrical equipment, which possesses certain distinct advantages.

Service Tests of a 53-Ton Electric Locomotive on the Ogden, Logan & Idaho Railway (81615). H. K. Smith and J. S. Hagan. Ills. 1200 w. Elec Jl—Oct., 1917. Tests and data deduced.

The New Split-Phase Locomotive of the Pennsylvania Railroad (81618). A. J. Hall. Ills. 1200 w. Elec Jl—Oct., 1917. The control equipment.

The New Split-Phase Locomotive of the Pensylvania Railroad (81617). G. M. Eaton. Ills. 1800 w. Elec Jl—Oct., 1917. Principal characteristics. The mechanical equipment.

**Electrification**

Notes on Railway Electrification (74260 A). A. H. Armstrong. 2500 w. Gen Elec Rev—Nov., 1916. Importance of dealing with the whole problem. Reasons for the success of the d. c. locomotive.

Some Practical Results Obtained by Electrification on the Chicago, Milwaukee & St. Paul Railway (74244 A). C. A. Goodnow. Ills. 1700 w. Gen Elec Rev—Nov., 1916. Shows the success of this great undertaking and the wonderful operating results.

The Electrification of the Mountain District of the Chicago, Milwaukee & St. Paul Railway (74247 A). W. D. Bearce. Map & Ills. 2200 w. Gen Elec Rev—Nov., 1916. Physical characteristics and principal features.

The Milwaukee Electrification (74246 A). W. B. Potter. 600 w. Gen Elec Rev—Nov., 1916. Reason for the adoption of the 3000-volt as the trolley potential.

The Montana Power Company and Its Part in the Electrification of Railways (74245 A). John D. Ryan. Ills. 2200 w. Gen Elec Rev—Nov., 1916. General layout and continuity of the system, and successful results.

Electrification of Steam Railroads (75383). Ills. 15 pp. Utah Soc. Engrs., Jl—Nov., 1916. Serial, 1st part. Details of important electrifications in the U. S.

Les Résultats D'Exploitation du chemin de fer des Alpes bernoises (75569 B). Ills. 3600 w. Gen Civ—Nov. 25, 1916. Results of electrification of Bernese Alps line through Loetschberg tunnel.

London & North Western Railway Electrification (75119 A). Ills. 1500 w. Tmwy & Ry Wld—Nov. 9, 1916. Equipment of the Broad street to Richmond route.

King of the Rails (76031 N). George H. Hill. Ills. 3500 w. N E Rd Cb—Nov. 23, 1916. The electrified portion of the C., M., & St. P. R. R.

New Lines and Services in London (76227). 1900 w. Times Eng Supp—Dec. 29, 1916. Recent electrification of steam railways in the suburban district.

Steam Railroad Electrification (76078). J. A. Shaw. From paper read before Can. Ry Club. 6000 w. Eng & Con—Jan. 17. 1917. Brief review of the principal electrifications.

Electrification of Steam Railroads (76627). William T. Whalen, with discussion. Ills. 7500 w. St L Ry Cb, Pro—Jan. 12, 1917. Results of the most important electrifications.

Il Materiale Rotabile Della Ferrovia Elettrica Rome-Frosinone (76901 C). Ills. 4400 w. Ingeg Ferro—Dec. 31, 1916. Rolling stock of 70 mile electric railway in Italy with 1650 volt D. C. power for motor cars.

Italian Electric Railways (76703 A). Ills. 4000 w. Engng—Jan. 26, 1917. Serial, 1st part. Reviews the reasons which have influenced the Italian electrical engineers in their selection of a type of contact line suspension with the required insulating devices.

Railway Electrification for Freight and Passenger Service at Buenos Aires, Argentina (76885). George E. Briggs. Ills. 2500 w. Ry Rev—Feb. 24, 1917. Recent developments.

St. Paul to Electrify Over Cascade Mountains (76479). Ills. 2200 w. Ry Age Gaz—Feb. 2, 1917. New electric zone to extend from Othello, Wash., to the Pacific Coast.

Review of Steam Railway Electrification (77290 N). W. R. Stinemetz, with discussion. 6500 w. N E Rd Cb—Feb. 13, 1917. Low and high pressure systems, methods, etc.

Alcuni Risultati Della Elettrificazione Del Loetschberg (77591 C). Ills. 2700 w. Ing Ferro—Feb. 1, 1917. Results of electrification of the Loetschberg line, Switzerland. Locomotive performance, energy consumption, etc.

Electrification of the Norfolk & Westen Railway Company (78057 A). C. H. Quinn. 15 pp. N Y Rd Cb, Pro—March 16, 1917. Conditions that led to the electrification and benefits derived.

Operating Results from the Trunk Line Electrification of the Chicago, Milwaukee & St. Paul Railway (78058 A). R. Beeuwkes. 12 pp. N Y Rd Cb, Pro—March 16, 1917. Comparison of delays, performance, etc.

Operating Results from the Electrification of the Trunk Line of the C. M. & St. P. Ry. (78489 A). R. Beeuwkes. Ills. 5000 w. Gen Elec Rev—May, 1917. A comparison of operating results during three months of 1915 and three months of 1916.

Canadian Northern Electrification at Montreal (78603). W. C. Lancaster. Maps & Ills. 3000 w. Ry Age Gaz—May 11, 1917. An electrically-operated 3.3 mile tunnel.

The Choice of Voltage for Railway Electrification on the Direct-Current System (78984 A) F. Lydall. 4000 w. Elec'n—May 11, 1917. Serial, 1st part. Conditions applying to main line electrification in England; discusses classes of electric locomotives, costs, effect on traffic, etc.

L'Électrification Des Lignes De Banliene (79422 B). A. Soulier. 2100 w. Le Nat—May 19, 1917. Electrification of the Paris suburban lines of the French State Railways Recent work.

Equipment for St. Paul's New Electrified Division (80062). Ills. 1200 w. Elec Ry Jl—July 21, 1917. Details of power supply, etc., of the Seattle-Othello division of the C. M. & St. P. Ry.

L'Electrification Des Chemins De Fer Du Midi (80023 B). A. Breton. Ills. 2000 w. La Nat—June 9, 1917. New installations for operating lines of the Midi Railway in southern France.

Le Chemin De Fer Italien Du Mont Cenis (80007 B). L. Pahin. Ills. 4000 w. Ind Elec—June 10, 1917. Electrification of the Mont Cenis line, about 37 miles, with three phase A. C.

An Unusual Railway Electrification (80228 N). A. H. Babcock. Ills. Read before San Francisco A. I. E. E. Branch, also "The Norfolk & Western Electrification." C. H. Quinn. Ills. 22 pp. A I E E—Jan. 26, 1917. Details of the electric system and its operation and related information.

Southern Pacific Railroad Extends Oregon Electrification (80475). Ills. 1200 w. Elec Ry Jl—Aug. 11, 1917. Forty-two additional miles electrified on the Portland division.

Mont-Cenis (Italy) Railway Electrification (80902). Lucien Pahin. Ills. 2000 w. Elec Ry Jl—Sept. 1, 1917. Severe operating conditions on a line on which there are 29 tunnels in 37 miles.

The Electrification of the Riksgrans Railway (80962 A). Ills. 2000 w. Elec'n—Aug. 17, 1917. Serial, 1st part.

Operating Experiences on the Philadelphia-Paoli Electrification (81613). Laurence M. Willson. Ills. 2200 w. Elec Jl—Oct., 1917. Experiences in the operation of this electrified line.

Progress on the Mount Royal (Montreal) Terminal Electrification (81917). Ills. 900 w. Elec Ry Jl—Oct. 20, 1917. All but a short stretch now electrified.

The Electrification of the Chicago, Milwaukee and St. Paul Railway (81699 N). J. W. Kirkland, with discussion. 14 pp. S Af Inst Elec Engrs, Trans—July, 1917. Details of engineering features.

**Engine Faliures**

A Study of "Engine Failures on the Santa Fe" (76530 A). 1200 w. Ry & Loco Eng—Feb., 1917. What a failure is, and is not. Remedies.

**Equipment**

Railroad Equipment Obligations (79124 N). Arthur S. Dewing. 23 pp. Am Ec Rev—June, 1917. Their value as a basis of credit.

**Feed Valves**

Feed Valve Tests (79712 A). 1000 w. Ry & Loco Eng—July, 1917. Comments on methods of testing.

**Feed Water**

Locomotive Feed Water Heating (78845). Ills. 3300 w. Ry Age Gaz—May 25, 1917. Report to International Railway Fuel Assn.

Locomotive Feed Water Heating (78777). Ills. 4500 w. Ry Rev—May 19, 1917. Study of applying feed-water heaters to locomotives.

Heating of Locomotive Feed Water (79710 A). Ills. 3000 w. Ry & Loco Eng—July, 1917. Advantages, economy, etc.

**Feed-Water Heaters**

Voorverwarming van het vœdingswater van locomotieven (74882 B). S. P. J. A. Van Hoogstraten. Ills. 3000 w. Ingr—Oct. 28, 1916. Description of several systems in use in England and Europe.

**Fire Boxes**

Firebox Efficiency (74292). J. T. Anthony. 4500 w. Ry Rev—Oct. 28, 1916. Read before Richmond Ry. Club. Factors that tend to increase the effectiveness.

Appareils Pour La Réparation des plaques tubulaires des foyers de locomotives (75566 B). L. Pierre-Guédon. Ills. 3800 w. Gen Civ—Nov. 18, 1916. Portable apparatus for reaming and tapping fire box sheets.

Locomotive Fire-Boxes (75644 A). Smith Mannering. Abstract of paper read before Instn. of Loc. Engrs., England. 2500 w. Ry Gaz—Dec. 15, 1916. Value of fusible plugs in fire-box crowns, influence of boiler feed, etc.

McClellan Water - Tube Firebox (77988). Ills. 1500 w. Ry Age Gaz—April 13, 1917. Designed to reduce maintenance cost and increase heating surface.

The Locomotive Fire-Box and Combustion Chamber (77935 A). J. T. Anthony, with discussion. Ills. 3500 w. S & S

W Ry Cb, Pro—Jan., 1917. Fire-box losses, combustion chambers, heating surface, etc.

The Effect of Firebox Design Upon Boiler Capacity and Economy (77936 A). J. T. Anthony, with discussion. Ills. 35 pp. Ry Cb Pitts—Feb. 23, 1917. Considers losses due to the furance design.

Mild Steel for Fireboxes (78449 A). Paul Kreuzpointner. 1000 w. Iron Age—May 3, 1917. Difficulties in England and Germany in substituting for copper.

McClellan Water-Tube Firebox (78546 A). Ills. 1400 w. Ry Mech Engr—May, 1917. Details of new design.

**Firebox Temperatures**

Firebox Temperature Tests, Texas & Pacific Railway (81132). Ills. 2500 w. Ry Rev—Sept. 15, 1917. Reports a series of tests for determining firebox temperatures at different points.

Firebox Temperature Experiments (81812 A). Ills. 2000 w. Ry Mech Engr Oct., 1917. Oil burning locomotive tests show increases in temperatures and boiler efficiency with Gaines wall.

Brick Arch Tests on the Texas & Pacific Railway (81542 A). Ills. 2200 w. Ry & Loc Eng—Oct., 1917. Importance of the pyrometer in firebox tests.

**Firedoors**

Height of Firedoors (81813 A). 1400 w. Ry Mech Engr—Oct., 1917. Pennsylvania R. R. tests show the bottom of the firedoor should be located 22 in. above the cab deck of locomotives.

**Freight Cars**

Freight Car Utilization and M. C. B. Rules (74818). N. D. Ballantine. Abstract of paper read before car Foremen's Assn. 3500 w. Ry Age Gaz—Nov. 24, 1916. Cost of repairs to foreign cars and suggestions for reduction.

The Ubiquitous Freight Car Question and Its Elusive Answer (74608). E. H. De Groot, Jr., with discussion. 35 pp. St L Ry Cb, Pro—Oct. 13, 1916.

A Seventy-Ton Capacity Well Car for the Pennsylvania R. R. (79162). Ills. 1000 w. Ry Rev—June 9, 1917. Original design.

Double Deck Stock Cars for the Santa Fe (79030). Ills. 1000 w. Ry Age Gaz—June 1, 1917. Equipment adapted to various classes of lading. Their value in service.

All-Wood Drop-Bottom Gondola Cars, Louisville & Nashville R. R. (79163). Millard F. Cox. Ills. 500 w. Ry Rev—June 9, 1917. Details of design.

**Fuel**

Fuel Department of the Rock Island (79997). 1800 w. Ry Age Gaz—July 20, 1917. Purchase, distribution, handling, and consumption of all fuel.

Powdered Coal for the Railways (81054 A). 3500 w. Ry Mech Engr—Sept., 1917. Abstract of committee report to the Int. Ry. Fuel Assn. Summary of developments with this grade of fuel on railways during past year.

**Fuel Economy**

Fuel Economy and Boiler Design (74607 N). J. T. Anthony, with discussion. Ills. 40 pp. N E Rd Cb, Pro—Oct. 10, 1916. Heat losses in locomotive boilers, and the problem of locomotive combustion.

**Fuel Tests**

Report of University of Illinois Fuel Tests (79883). 4500 w. Ry Age Gaz—July 13, 1917. Abstract of committee report to the International Ry. Fuel Assn.

**Gun Car**

Car-Mounted Gun Reduces Coast Defense to Engineering Problem (78350). Ills. 1500 w. Eng News-Rec—April 26, 1917. Scheme for coast protection.

**Headlights**

The High-Power Headlight Rule (75794 A). 3000 w. Ry Rev—Jan. 6, 1917. Headlight order and rule, with the modifications.

Care and Maintenance of the Locomotive Electric Headlight (80915 A). James Dougall. Ills. 2500 w. Ry & Loco Eng—Sept., 1917. Some of the troubles they are subject to, and methods used in correcting them.

**Hot Boxes**

The Hot Box—Its Cause and Cure (77134 A). J. F. Leake. 600 w. Ry Mech Engr—March, 1917. Considers six principal causes.

Hot Box Problem Not Insurmountable (75953 A). 3500 w. Ry Mech Engr—Jan., 1917. Serial, 1st part. Letters submitted in a competition, which discuss the subject from many viewpoints.

**Industrial Trucks**

Industrial Trucks on the Pennsylvania (74562 A). T. V. Buckwalter. Ills. 1200 w. Ry Gaz—Oct. 27, 1916. Classes of trucks and their uses.

**Injectors**

Construction and Operation of the Injector (80340 A). Ills. 1500 w. Ry & Loc Eng—Aug., 1917. Gifford's invention. Injector troubles and their remedies.

**Inspection**

The Locomotive Inspection Laws and Rules; Their Purposes and Achievements (77289). Frank McManamy, with discussion. 6500 w. St L Ry Cb, Pro—Feb. 9, 1917. Aims to promote safety on railroads.

**Instruction Car**

Fuel Instruction Car on the Northern Pacific Railway (75975 A). Ills. 4500 w. Ry Gaz—Dec. 29, 1916. Details of the car, and abstracts of lectures given in it to inspire enginemen and firemen.

**Japan**

Locomotive Building in Japan (81243). "Hi" Sibley. Ills. 1200 w. Am Mach—Sept. 20, 1917. Japanese methods described.

**Locomotive Boilers**

Water Conditions in the Locomotive Boiler (77029). George L. Fowler. Ills. 3000 w. Ry Age Gaz—March 2, 1917. The boiler a laboratory where chemical reactions change the character of feed water impurities.

**Locomotive Cranes**

Locomotive Cranes for Railway Use (74375 A). Ills. 800 w. Ry & Loco Eng—Nov., 1916. Kinds of work performed.

**Locomotive Design**

Locomotive Design from a Maintenance Standpoint (81909). W. H. Winterrowd. From paper before Can. Ry. Club. 2000 w. Ry Age Gaz—Oct. 19, 1917. Points worthy of consideration.

Preliminary Locomotive Design (81811 A). W. R. Maurer. 4000 w. Ry Mech Engr—Oct., 1917. Methods of determining the size of locomotives and the fundamental features of their design.

**Locomotive Drafting**

Fuel Economy and Proper Drafting of Locomotives (75479 A). D. R. MacBain, with discussion. Ills. 40 pp. Cen Ry Cb—Nov. 10, 1916.

Fuel Economy and Proper Drafting of Locomotives (77133 A). D. R. MacBain. Ills. 1800 w. Ry Mech Engr—March, 1917. Means of decreasing fuel consumption and increasing engine efficiency.

**Locomotive Firing**

Mechanical Firing of Locomotives (75384). W. S. Bartholomew, with discussion. Ills. 47 pp. St L Ry Cb, Pro—Nov. 10, 1916. Outlines the history of mechanical stokers, and applications to locomotives.

**Locomotive Furnace**

The Locomotive Furnace (77291 A). J. T. Anthony, with discussion. Ills. 27 pp. N Y Rd Cb, Pro—Feb. 16, 1917. Heat losses, furnace efficiency, firebox volume and combustion chambers, etc., are discussed.

**Locomotive Operation**

Modern High-Power Locomotive Economy in France (79588 A). 1800 w. Engr—June 8, 1917. Results from modern simple and compound express locomotives.

**Locomotive Performance**

Locomotive Performance on the London and Northwestern Railway (74501 A). 3500 w. Engr—Oct. 20, 1916. Serial, 1st part. Reviews performance in heavy service.

Firebox Volume and Boiler Performance (78149). J. T. Anthony. Ills. 2500 w. Ry Age Gaz—April 20, 1917. Effect on combustion and firebox evaporation.

Locomotive Performance on the North-Eastern Railway (81361 A). 3000 w. Engr—Sept. 7, 1917. Serial, 1st part. Types of engines, gradients, and locomotive work.

Notes on Steam and Electric Locomotive Performance (81610). F. E. Wynne. 1700 w. Elec Jl—Oct., 1917. Comparing the performance, advantages and relative efficiencies.

**Locomotive Repairs**

Quick Repairs to a Heavy Locomotive (79537 B). Ills. 700 w. Ry Age Gaz—June 22, 1917. (Special No.) Repairs given a consolidation engine at shops of D. & H. in 33 hours.

Over the Pits in a Railroad Shop (81040). Frank A. Stanley. Ills. 2200 w. Am Mach—Sept. 13, 1917. Methods for rapid repairs.

**Locomotives**

Heavy Freight Locomotives for the D. M. & N. (75444). Ills. 1200 w. Ry Age Gaz—Dec. 22, 1916. Mallets and 2-10-2 types in ore service.

Modern British Goods Locomotives (75273 A). E. C. Poultney. Ills. 7000 w. Ry Mech Engr—Dec., 1916. 2-8-0 and 4-6-0 types are largest used.

Passenger Locomotives for the Caledonian Railway (75230 A). Ills. & Plate. 700 w. Engng—Nov. 24, 1916. Engines of 4-4-0 type.

Twenty Locomotives for the Bessemer & Lake Erie (75075 A). Ills. 1500 w. Ry & Loco Eng—Dec., 1916. Heavy freight engines with devices for promoting economy in operation.

British Locomotive Design and Performance (76139 A). 1800 w. Ry Gaz—Jan. 5, 1917. Serial, 1st part. Present article deals with passenger locomotives.

Duplex Locomotives on the Southern Railway (75962). Ills. 1200 w. Ry Rev—Jan. 13, 1917. Particulars of an innovation for lessening congestion.

Express Tank Locomotive, 4-6-4 Type—London, Brighton & South Coast Railway (75633 A). Ills. 2200 w. Ry Gaz—Dec. 8, 1916. Details of design and operation.

Mikado Type Locomotives for the Great Northern Ry. (75793 A). Ills. 700 w. Ry Rev—Jan. 6, 1917. Details.

Railroad Sessions (75859 A). 4000 w.

A S M E, Jl—Jan., 1917. Brakes, pulverized fuel, electric locomotives, etc.

The Yard Engine Question (75839 A). 2500 w. Ry & Loco Eng—Jan., 1917. Tests of engines using superheated and saturated steam. Favors superheater engine.

Virginian Triplex Type Pusher Locomotive (76278). Ills. & Plate. 1800 w. Ry Age Gaz—Jan. 26, 1917. Articulated compound locomotive, 2-8-8-8-4.

Duplex Locomotives for the Southern Railway (76754). Ills. 1200 w. Ry Age Gaz—Feb. 16, 1917. Running gear and machinery of retired engines applied to Mikado tenders with economical results.

The Switch Engine Question (76529 A). Ills. 8000 w. Ry & Loco Eng—Feb., 1917. Details of various designs.

Triplex Articulated Compound Locomotives for the Virginian Railway (76392). Ills. 1800 w. Ry Rev—Jan. 27, 1917. For helper service over mountain grades.

British-Built Tank Locomotives for the Paris-Orleans Railway (77659 A). Ills. 300 w. Engr—March 9, 1917. Details of 2-8-2 Mikado type.

Duplex 2-8-2 + 2-8-0 on the Southern Railway (77112 A). Ills. 800 w. Ry & Loco Eng—March, 1917. Novel change in locomotive construction.

Locomotives of the United Kingdom (77656 A). E. L. Ahrons. 700 w. Engr—March 9, 1917. Particulars of the tender locomotives in use at end of 1915.

Southern Duplex Locomotives (77131 A). Ills. 1000 w. Ry Mech Engr—March, 1917. Running gear and machinery of retired engines applied to the tenders of Mikado locomotives. An ingenious design.

Triplex Articulated Compound Locomotive for the Virginian Railway (77109 A). Ills. 3000 w. Ry & Loco Eng—March, 1917. Detailed description of interesting features.

Virginian Railway Has World's Greatest Steam Locomotive (77334). Ills. 1700 w. Eng News—March 15, 1917. Triple compound locomotive with maximum tractive effort of 166,300 lbs. Largest Triplex built.

Compound Locomotive for the Madrid, Saragossa and Alicante Railway of Spain (77743 A). Ills. 800 w. Ry & Loco Eng—April, 1917. 4-8-0 type, built by Am. Loco. Co.

Locomotives for the Paris and Orleans Railway (77914 A). Plates. 500 w. Engng—March 16, 1917. Particulars and dimensions of engines of 4-6-0 type.

New Passenger Tank Engines for the North Staffordshire Railway (78214 A). Ills. 300 w. Engr—March 30, 1917. Leading particulars of bogie tank engines with six coupled driving wheels.

Recent American Heavy Goods Locomotives (77918 A). Ills. 2000 w. Engr—March 16, 1917. Designs of heavy goods or mineral locomotives, of 2-8-2 and 2-10-2 types.

Spanish Passenger Locomotives (77866 A). Ills. 800 w. Ry Mech Engr—April, 1917. American built, balanced compound, 12-wheel engines.

2-8-2 Type Locomotive for the Temiskaming and Northern Ontario Railway (77747 A). Ills. 1000 w. Ry & Loco Eng—April, 1917. Details of engines recently put in service.

Heavy Locomotives for the Lehigh Valley (78357). Ills. 1500 w. Ry Age Gaz—Apr. 27, 1917. Powerful Pacific and 2-10-2 type locomotives.

Locomotives of the 4-6-2 and the 2-10-2 Type for the Lehigh Valley Railroad (78441 A). Ills. 1800 w. Ry & Loco Eng—May, 1917. 30 Pacific and 40 Santa Fe type recently put in service. New features of design.

Mallet Articulated Locomotives for the Philadelphia & Reading Ry. (78524). Ills. 1000 w. Ry Rev—May 5, 1917. Designed for pusher service over three per cent grades.

Mountain and Santa Fe Type Locomotives for the Southern Ry. (78927). Ills. 800 w. Ry Rev—May 26, 1917. Two new designs for heavy freight and passenger service.

New Power for the Lehigh Valley (78545 A). Ills. 1000 w. Ry Mech Engr—May, 1917. Pacific type and 2-10-2 type for fast and slow freight service.

Decapod Locomotive for the Pennsylvania R. R. (79391). Ills. 700 w. Ry Rev—June 23, 1917. Orders placed for 120 of this type.

Mikado and Consolidation Types Compared (79106). Ills. 1800 w. Ry Age Gas—June 8, 1917. Tests of Pennsylvania 2-8-2 show 25 per cent. more tractive effort at 10 m.p.h. and 60 per cent. at 30 m.p.h.

Modernizing Locomotives (79057 A). 1800 w. Ry & Loco Eng—June, 1917. Review of progress during the last 25 years.

Pacific and Santa Fe Type Locomotives for the St. Louis-San Francisco Ry. (79390). Ills. 1000 w. Ry Rev—June 23, 1917. Modern heavy engines for freight and passenger service.

Pennsylvania Locomotive of the Decopod Type (79248). Ills. 1200 w. Ry Age Gaz—June 15, 1917. Unique features of design.

Mikado Type Locomotive Tests (79288

A). 2500 w. Ry Mech Engr—June, 1917. Pennsylvania test plant results obtained with Mikado and Consolidation locomotives.

Illinois Central 2-10-2 Type Locomotives (79998). Ills. 700 w. Ry Age Gaz —July 20, 1917. Description and principal dimensions.

Mogul 2-6-0 Switcher for the Baltimore & Ohio (79708 A). Ills. 2200 w. Ry & Loco Eng—July, 1917. Fitted with extensive application of specialties.

New Power for Southern Railway (79891 A). Ills. 1000 w. Ry Mech Engr—July, 1917. Mountain type locomotives for passenger service, used for freight service.

Conversion of Consolidated Type Locomotives to Eight-wheel Switcher (80453). F. J. Carty. Ills. 1500 w. Ry Age Gaz—Aug. 10, 1917. Details of the work.

D. & R. G. Santa Fe Type Locomotives (80419 A). Ills. 1000 w. Ry Mech Engr—Aug., 1917. Heaviest non-articulated locomotives ever built.

4-8-2 Type Locomotives for the New York Central R. R. (80474). Ills. 600 w. Ry Rev—Aug. 11, 1917. Leading features and particulars.

Modern British Tank Locomotives (80418 A). E. C. Poultney. Ills. 3800 w. Ry Mech Engr—Aug., 1917. Engines used to move both passenger and goods local traffic.

Powerful Pennsylvania Railroad Decapod or 2-10-0 Locomotive Built at the Juniata Shop (80338 A). Ills. 1800 w. Ry & Loc Eng—Aug., 1917. Detailed description.

The Heaviest Santa Fe Type Locomotives (80314). Ills. 1200 w. Ry Age Gaz—Aug. 3, 1917. Used in both road and pusher service on heavy grades of the Denver & Rio Grande.

Mikado Type Locomotive, Louisville & Nashville Railroad (81008). Millard F. Cox. Ills. 1500 w. Ry Rev—Sept. 8, 1917. Design of high-powered freight locomotive having original features; dimensions, etc.

Die neuen Lokomotiven der Nelgiri-Bahn (81379 B). S. Abt. Ills. 1100 w. Schweiz Bau—Aug. 18, 1917. Combined adhesion and rack rail locomotive-0-10-2 wheel arrangement for Nilgiri Railway, India.

Symposium on Steam Locomotives Held by the Minnesota Section (80888 A). Ills. 14 pp. A S M E, Jl—Sept., 1917. Eight articles by different authors on modern practice and related topics.

Cross Balance of Locomotives (81814 A). C. H. Faris. Ills. 1500 w. Ry Mech Engr—Oct., 1917. Advantages and fundamental reasons for the practice.

Decapod Locomotives for Russian Government (81768). Ills. 1800 w. Ry Age Gaz—Oct. 12, 1917. Heavy freight locomotives built in America.

Pacific and Santa Fe Type Locomotives for the St. Louis-San Francisco Railway (81543 A). Ills. 1200 w. Ry & Loc Eng—Oct., 1917. Comparison between the new and older types.

New Locomotives on the South-Eastern and Chatham Railway (81946 A). Ills. & Plate. 1000 w. Engr—Oct. 5, 1917. Two new types, one for passenger service the other for goods, but only differing slightly.

Shay Geared Locomotive Used as a Switcher (81540 A). Ills. 2500 w. Ry & Loc Eng—Oct., 1917. Comparative tests against an 0-6-0 switcher.

British Express Locomotives (74448 A). E. C. Poultney. Ills. 4000 w. Ry Mech Engr—Nov., 1916. Types of high-speed passenger engines in use.

Canadian Pacific Mountain Type Locomotives (74477 A). W. H. Winterrowd. Ills. 1500 w. Ry Gaz—Oct. 20, 1916. Type with Gaines combustion chamber firebox for heavy gradients.

Die Lokomotiven der Furkabahn (74871 B). Ills. 1200 w. Schweiz Bau—Oct. 14, 1916. Swiss locomotive for adhesion and rack operation.

History of Locomotive Development (74552 A). Ills. 4000 w. E. Cb Phila, Pro—Nov., 1916. History of Baldwin Locomotive Works.

Pacific Type of Locomotive for the Central of Georgia Railroad (74380 A). Ills. 2500 w. Ry & Loco Eng—Nov., 1916. Design to suit requirements.

South African Railways' Locomotives 74735 A). Ills. 700 w. Ry Gaz—Nov. 3, 1916. Two of the largest and heaviest locomotives.

**Locomotive Scales**

See SCALES, under MECHANICAL ENGINEERING, *Measurement.*

**Locomotive Service**

Standardization and Improved Locomotive Service (81810 A). George Armstrong. 1600 w. Ry Mech Engr—Oct., 1917. Advantageous possibilities of group assignment of power, standardization of parts and centralized production.

**Locomotive Stoking**

What Effect Does the Mechanical Placing of Fuel in Fireboxes and Lubrication of Locomotives Have on the Cost of Operation (74293). 4000 w. Ry Rev—Oct. 28, 1916. Technical report to Trav. Engrs' Assn.

**Locomotive Tests**

Pennsylvania Atlantic Type Locomotive Tests (77503). Andrew C. Loudon. Ills. 3000 w. Ry Age Gaz—March 23, 1917. Shows value of test plant in determining correct locomotive design and proportions.

**Locomotive Tires**

The Shrinkage Allowance for Locomotive Tires (81860 A). E. A. Ahrons. 1500 w. Engr—Sept. 28, 1917. Shows discrepancies on different railways.

**Lubrication**

Lubrication of Superheated Engines (77742 A). 1800 w. Ry & Loco Eng—April, 1917. Reviews a lecture by Dr. P. H. Conradson.

The Lubrication of Freight Cars in Interchange (79342 A). T. J. Burns, with discussion. 17 pp. Can Ry Cb, Pro—May, 1917. Urges periodical reoiling and repacking.

**Military Locomotives**

Small Locomotives Used at the Front (79539 B). Ills. 1800 w. Ry Age Gaz—June 22, 1917. (Special No.) Some of the small engines used near the firing line in France.

**Motor Cars**

Oil-Electric Motor Car (80868). Ills. 1000 w. Ry Age Gaz—Aug. 31, 1917. New type of self-propelled car.

Gasoline Motive Power on Far Western Railways (81913). Ills. 3000 w. Elec Ry Jl—Oct. 20, 1917. Types in use.

The Self-Contained Railway Motor Car (81793). Raymond S. Zeitler. Ills. 2000 w. Ry Rev—Oct. 13, 1917. Reviews systems of power production and transmission that have been tried.

**Packing Leathers**

Cleaning and Lubricating of Brake Cylinders Packing Leathers (80221). R. C. Burns. Ills. 900 w. Ry Rev—July 28, 1917. Outlines methods used.

**Passenger Cars**

All-Steel Passenger Car Equipment for the Erie Railroad (79161). Ills. 1000 w. Ry Rev—June 9, 1917. Design involving the trussed side frame construction devised by L. B. Stillwell. Unusually light dead weight per passenger.

**Powdered Fuel**

Peat Powder as Locomotive Fuel (74495 A). 1000 w. Engng—Oct. 20, 1916. Experiments in Sweden to determine economy.

Powdered Coal in Engine Service (74449 A). C. W. Corning. Ills. 1800 w. Ry Mech Engr—Nov., 1916. Results on C & N-W Ry.

Pulverized Fuel for Locomotives (75004 A). John E. Muhlfeld. Ills. 5000 w. A S M E, Jl—Dec., 1916. Facts and conclusions from research and of development work. (Abstract.)

Pulverized Fuel for Locomotive Service (75331). J. E. Muhlfeld, with discussion. 4500 w. Ry Age Gaz—Dec. 15, 1916. Abstract of paper and discussion before the railroad session of A. S. M. E.

Pulverized Fuel for Locomotives (76475 A). 4000 w. A S M E, Jl—Feb., 1917. Discussion of J. E. Muhlfeld's paper, with closure.

**Powdered Peat**

Peat Powder Fuel for the Swedish State Railways (80573 A). 1500 w. Engng—Aug. 3, 1917. Particulars in regard to work in Sweden to utilize the peat deposits.

**Power Plants**

Power Plant Supervision on the Baltimore & Ohio (81773). Ills. 2000 w. Ry Age Gaz—Oct. 12, 1917. The system, and what it has accomplished.

**Railway Motors**

Do Changing Conditions Favor Constant-Speed Railway Motors? (82105). R. E. Hellmund. 4000 w. Elec Ry Jl—Oct. 27, 1917. Believes the tendency to be toward constant-speed operation.

See also same heading under ELECTRICAL ENGINEERING, *Generators and Motors.*

**Refrigerator Cars**

Refrigeration in Transit (74425). Charts. M. E. Pennington. 2500 w. Ry Rev—Nov. 4, 1916. Efficiency of refrigerator cars.

**Regenerative Braking**

The Control Equipment, with Regenerative Electric Braking Feature, on the Locomotives of the Chicago, Milwaukee & St. Paul Railway (74250 A). R. Stearns. Ills. 3000 w. Gen Elec Rev—Nov., 1916. Details of control features, especially the regenerative control.

**Repairs**

Running Repairs on Steam Locomotives (80914 A). Ills. 2200 w. Ry & Loco Eng—Sept., 1917. Readjusting the main and connecting rods.

**Resistance**

Resistance of Passenger Train Equipment (77188). E. C. Schmidt and H. H. Dunn. 1500 w. Ry Age Gaz—March 9, 1917. Results of a study made with a dynamometer car.

Train Resistance: Principles and Data (75122 A). H. Parodi. Abstract from *La Lumiere Elec.* 2500 w. Eng Rv—Nov. 15, 1916. Serial. 1st part. Discussion.

**Rods**

Locomotive Rod Job (79286 A). Ills. 3000 w. Ry Mech Engr—June, 1917. Serial, 1st part. Prize winning papers of the rod job competition. This number gives the first prize paper by Ernest A.

Miller, on "Organization and Methods for Handling Rods."

**Rolling Stock**

Car and Locomotive Orders in 1916 (75951 A). 4000 w. Ry Mech Engr—Jan., 1917. Year's business of over $550,000,000.

**Safety Appliances**

The Safety Appliance Standards, Their Purpose and the Reasons Underlying Their Fixed and Definite Location (79343). Hiram W. Belnap, with discussion. 28 pp. St L Ry Cb, Pro—May 11, 1917. Reviews the history of their development.

**Safety Valves**

Construction and Operation of Locomotive Safety Valves (81541 A). Ills. 2500 w. Ry & Loc Eng—Oct., 1917. Variations and improvements in designs.

**Scales**

Locomotive Weighing Scales (75096 A). A. W. Thompson. Ills. 1500 w. Gen Elec Rev—Dec., 1916. Improved design, with results of actual weighings. Limits of accuracy.

**Side Bearings**

Side Bearing Locomotive (77032). Lewis K. Sillcox. Ills. 1200 w. Ry Age Gaz—March 2, 1917. Study of the subject.

**Smoke**

Factors in Locomotive Smoke Abatement (81482). J. T. Anthony. Ills. 3000 w. Ry Age Gaz—Sept. 28, 1917. How brick arches reduce smoke. Ample combustion space and flameway needed.

**Stokers**

Duplex Locomotive Stoker (80341 A). Ills. 1500 w. Ry & Loc Eng—Aug., 1917. Mechanism and operation.

**Superheating**

Locomotive Superheating (74475 A). 3000 w. Ry Gaz—Oct. 20, 1916. Serial, 1st part. Use of high-temperature steam in locomotive boilers.

Pistons, Valves, Rings, and Bushings (79709 A). Ills. 1800 w. Ry & Loco Eng—July, 1917. Changes and improvements made necessary by it.

Superheating Slide Valve Engines (80912 A). 1500 w. Ry & Loco Eng—Sept., 1917. Synopsis of H. R. Stafford's paper. Variety of designs; difficulty in lubrication, etc.

**Supply Car**

Hülfswagen der Rhätischen Bahn (80705 B). A. Guhl. Ills. 1000 w. Schweiz Bau—July 14, 1917. Car for carrying stock of extra parts and appliances for use in emergencies.

**Tank Cars**

Tank Cars for the Santa Fe (81817 A). Ills. 800 w. Ry Mech Engr—Oct., 1917. Constructed in accordance with the latest M. C. B. Class III specifications, of 12,000 gal. capacity.

**Tires**

The Manufacture of Weldless Steel Tires for Locomotive and Car Wheels (76192 D). Guilliaem Aertsen. 2500 w. A I M E, Bul—Jan., 1917. Brief historical review.

**Top-Feed**

New Top-Feed Arrangement for Locomotive Boilers—London, Brighton & South Coast Railway (75643 A). Ills. 500 w. Ry Gaz—Dec. 15, 1916. Detailed description.

**Tractive Effort**

Methoden voor de bepaling van de trekkracht en de œconomie der stoomlocomotieven (74857 B). F. Westendorp. 3700 w. Ingr—Oct. 7, 1916. Discussion of economy and tractive effort of steam locomotives.

**Trucks**

Articulated Six-Wheel Freight Car Truck (80869). Ills. 700 w. Ry Age Gaz—Aug. 31, 1917. Interesting design for the Virginia Ry. for use under 120-ton steel coal car.

**Turntable Tractors**

Electrically-Driven Turntable Tractors (80342 A). Ills. 1100 w. Ry & Loc Eng—Aug., 1917. Recent types.

**Vacuum Brake**

Vacuum Brake Improvements (77658 A). Ills. 800 w. Engr—March 9, 1917. Recent modifications in design.

**Valve Gear**

The Young Locomotive Valve Gear (74377 A). Ills. 1800 w. Ry & Loco Eng—Nov., 1916. Details of improvements.

The Baker Locomotive Valve Gear (75840 A). 1200 w. Ry & Loco Eng—Jan., 1917. Objects of the design, with result of test.

The Southern Locomotive Valve Gear (76531 A). Ills. 1200 w. Ry & Loco Eng—Feb., 1917. Résumé of its construction and operation.

Walschaert Valve Gear Design (76536 A). H. A. Weis. Diagrams. 2200 w. Ry Mech Engr—Feb., 1917. Mathematical determination of the proportions of moving parts to meet locomotive conditions.

The Walschaerts Locomotive Valve Gear (77110 A). Ills. 2000 w. Ry & Loco Eng—March, 1917. Construction and adjustment; methods of disconnecting in case of breakage.

The Stephenson Locomotive Valve Gear (78444 A). Ills. 1800 w. Ry & Loco Eng—May, 1917. Details of construction; methods of adjustment, etc.

**Wagon Union**
The German State Railway Wagon Union (76847 A). 3000 w. Ry Gaz—Feb. 2, 1917. Particulars of the formation and constitution.

**Wedges**
The Laying Out and Maintenance of Shoes and Wedges (78443 A). Ills. 1500 w. Ry & Loco Eng—May, 1917. Recent improvements in design.

**Wheels**
Chilled Iron Wheels for Engine Tender Service (77745 A). F. K. Vial. Ills. 2000 w. Ry & Loco Eng—April, 1917. Information and possible improvements.

A General Survey of the Mechanics of the Chilled Iron Car Wheel (80463 A). George W. Lyndon and F. K. Vial. Ills. 80 pp. Ry Cb Pitts, Pro—May 25, 1917.

Wheel Work and Other R. R. Shop Operations (81570). Frank A. Stanley. Ills. 1500 w. Am Mach—Oct. 4, 1917. Methods in shops of the Southern Pacific.

**Yard Engines**
Yard Engine Adaptation to Service (74382 A). Ills. 1500 w. Ry & Loco Eng—Nov., 1916. Conditions, and suitable types.

## PERMANENT WAY AND BUILDINGS

**Alaska**
Progress on Government Railway in Alaska (78147). Map & Ills. 3000 w. Ry Age Gaz—April 20, 1917. Details of line and construction methods.

**Atlanta**
Would Replace Atlanta's Two Passenger Terminals with One on New Site (75376). Ills. 2000 w. Eng Rec—Dec. 16, 1916. Changes recommended by Barclay Parsons & Klapp.

**Ballast**
Report of Committee II—On Ballast (76794 C). Ills. 33 pp. A R E A, Bul—Jan., 1917. Merits of different materials, etc.

**Banquette Construction**
Railway Fill with Banquette Flood Guard (76478). Albert S. Fry. Ills. 1000 w. Contr—Feb. 2, 1917. Improved device for forming banquette on slopes.

**Blacksmith Shop**
A Railroad Blacksmith Shop (81976). Frank A. Stanley. Ills. 1500 w. Am Mach—Oct. 25, 1917. Ingenious steam and water curtains that prevent the heat issuing from the mouths of forges.

**Buffalo**
New York Central Passenger and Freight Terminal at Buffalo (75447). Ills. 1000 w. Ry Age Gaz—Dec. 22, 1916. Proposed plans.

**Chicago**
Illinois Central Presents New Terminal Plans (75445). Ills. 1500 w. Ry Age Gaz—Dec. 22, 1916. Plans proposed for Chicago.

**Coaling Station**
Reinforced Concrete Coaling Stations on the St. Louis-San Francisco Ry. (76150). Ills. 800 w. Ry Rev—Jan. 20, 1917. Detailed description at West Tulsa, Okla., and Willow Springs, Mo.

**Coal Stage**
Mechanical Coal Stage at Hull (74309 A). Plate & Ills. 1000 w. Engr—Oct. 13, 1916. Appliance of the N-E Ry. Co. for coaling locomotives.

**Concrete Ties**
Experiments with Concrete Ties at Riverside, Calif. (77341). J. H. G. Wolf. Ills. 1000 w. Eng News—March 15, 1917. A new hollow reinforced-concrete tie stands up well in experimental service.

Longitudinal Sleepers for Railways and Tramways (80404 A). Ills. 800 w. Engr—July 13, 1917. Details of new method of constructing railway and tramway lines introduced by Signor Olindo Valeri, of Asti, Italy.

**Crossings**
A Method of Lining Out Points and Crossings, etc., with String Lines (76732 N). John Hayes. Ills. 1000 w. Per-Way Instn—Dec., 1916. System explained.

Railroad Grade Crossing Survey in California (77027). Max Thelen. 2000 w. Ry Age Gaz—March 2, 1917. Investigation by the California Commission.

**Drafting Room**
Northern Pacific Railway Has Fine New Drafting Room (79604). Ills. 2500 w. Eng News-Rec—June 28, 1917. Detailed description.

**Drainage**
Sub-Drainage of Wet Cuts with Vitrified Tile on Missouri Pacific System (74936 C). W. C. Curd. 1000 w. A R E A—Sept., 1916. Conclusions from experience.

**Fire Protection**
Fire Protection, Inspection and Signaling in the Southern Pacific's Snowshed Disrict (77765). Ills. 2200 w. Ry Rev—March 31, 1917. Problems in connection with the maintenance and operation of snowsheds.

Railway Fire Protection Association Meets (81769). 6000 w. Ry Age Gaz—Oct. 12, 1917. Reports on fire prevention as related to explosions.

**Flood Damage**

Repairing Flood Damage on the Southern (75024). Ills. 2500 w. Ry Age Gaz—Dec. 1, 1916. Severe damages quickly restored.

**Freight Houses**

Halles A Marchandises A Étage (74900 B). Ills. 4100 w. Gen Civ—Oct. 28, 1916. Description of typical large freight stations in England and France.

Pennsylvania Freight House at Indianapolis (79885). Ills. 2200 w. Ry Age Gaz—July 13, 1917. Details of new inbound house and tracks.

**Freight Station**

Huge Chicago Freight Station for Pennsylvania Lines (76281). Ills. 1900 w. Eng News—Jan. 25, 1917. Two-level freight house with three floors above to be used for warehouse purposes.

Pere Marquette Freight Station at Chicago (80451). Ills. 1000 w. Ry Age Gaz—Aug. 10, 1917. Special features and conveniences.

**Frogs, Switches, Etc.**

Specifications for Frogs, Switches, Crossings, and Slip-Crossings (74937 C). 8 pp. A R E A—Sept., 1916. For Penn. lines west of Pittsburgh.

**Grade Crossings**

Elevation vs. Depression, and Track Change vs. Street Change (78338). 1500 w. Eng News-Rec—April 19, 1917. A. R. E. A. discusses advantages and disadvantages of four main forms of grade separation.

**Grades**

Railway Grade Changes in Two Cities (77537). Ills. 1800 w. Eng News—March 22, 1917. Special station and grade-crossing work at Jamestown, N. D., and Aurora, Ill.

**Grade Separation**

The Grade Separation Problem at Syracuse (77986). Ills. 3000 w. Ry Age Gaz—April 13, 1917. Report of Bion J. Arnold advocates track elevation of the D. L. & W. and depression of the N. Y. C.

Grade Separation—Two Distinct Methods (78931 A). Samuel T. Wagner. Ills. 35 pp. Engr Soc Penn, Jl—Nov.-Dec., 1916. How the problems were solved in the city of Philadelphia.

**Hell Gate**

The New York Connecting Railroad (77375). Ills. 500 w. Ry Age Gaz—March 16, 1917. Brief account of the dedication of the Hell Gate bridge.

**Holland**

De bouw van het stations emplacement te Deventer (80708 B). A. F. H. De Ranitz. Ills. 4500 w. Ingr—June 30, 1917. New railway station under construction at Deventer, Holland. Layout of yards and tracks.

**Light Railways**

The Use of Light Railways in the War (79535 B). Ills. 1200 w. Ry Age Gaz—June 22, 1917. (Special No.) 5000 miles of 2 ft. and 3 ft. gage lines have been laid to carry supplies.

**Maastricht**

Het nieuwe station te Maastricht Ingr—Nov. 25, 1916. (75599 B). G. W. Van Henkelom. Ills. 2300 w. New station of Dutch State Railways at Maastricht. Architectural treatment, arrangement, and facilities.

**Maintenance Work**

Some Present-Day Problems in Railway Maintenance Work (81762). F. B. Tapley. Abstract of paper before Can. Ry. Club. 2500 w. Can Engr—Oct. 11, 1917. Particularly the problems in Canada in regard to track, labor, etc.

**Narrow Gauge**

Construction of a Narrow Gauge Railway in the Republic of Panama (76026 B). Aaron S. Zinn, with discussion. Map & Ills. 6500 w. West Soc Engrs, Jl—Nov., 1916. Features in the contract and construction.

Refection De La Voie de m.60 (77559 B). E. Maynard. Ills. 1800 w. Gen Civ—Feb. 17, 1917. Rebuilding a French railway of 23½ in. gauge 19 miles long.

**Rail Bending**

Improved Jim Crow for Bending Wing Rails (76731 N). Thomas Lee. Ills. 700 w. Per-Way Instn—Dec., 1916. Particulars of working parts.

**Rail Failures**

Rail failure Attributed to Track Service (79102 A). Ills. 3000 w. Iron Age—June 7, 1917. Report on Texas accident attributes transverse fissures to fatigue fractures

Seaminess as a Cause of Rail Failures (80595). Ills. 1700 w. Ry Age Gaz—Aug. 17, 1917. Abstract of report by James E. Howard on the rail failure occurring on the Penn. R. R., near Newark, N. J., on Feb. 16, 1917. Study of microphotographs.

**Rail Fissures**

Transverse Fissures in Rails (75673). Dr. P. H. Dudley. Ills. 2500 w. Ry Rev—Dec. 30, 1916. Addenda to earlier report.

**Rails**

An Elaborate Study of Transverse Fissures (77499). 1500 w. Ry Age Gaz—March 23, 1917. Abstract from report of James E. Howard on a detailed study.

Induced Interior Transverse Fissures in Heads of Two Types (77509 N). P. H.

Dudley. Ills. 18 pp. A R E A, Bul—March, 1917. Cause and effect, etc.

Report of Committee IV—On Rail (77508 N). 2500 w. A R E A, Bul—March, 1917.

Some Transverse Fissure Rails on the Louisville and Nashville Railroad (77511 N). M. H. Wickhorst. Ills. 17 pp. A R E A, Bul—March, 1917. Results of examination of eleven rails which broke, showing transverse fissures.

The Rail Failure Situation (77512 N). M. H. Wickhorst. Ills. 13 pp. A R E A, Bul—March, 1917. Types of failures, causes and remedies.

The Quick Bend Test of Rails as a Substitute for the Drop Test (77510 N). W. C. Cushing. Ills. 108 pp. A R E A, Bul—March, 1917. Details of tests.

Transverse Fissures in Rails (78078 A). George W. Dress. Ills. 4000 w. Iron Age—April 19, 1917. Causes of these defects. Their nature, occurrence and the remedy.

Rail Inclination and Wheel Tread Contour (77749 A). Ills. 1000 w. Ry & Loco Eng—April, 1917. Relation of wheel to rail.

Origin and Development of the Railway Rail in England and America (78802 N). G. P. Raidabaugh. Ills. 42 pp. Ir & St Inst—May, 1917. Historical review and various designs.

Progress in the Rail Problem Marked by Sharp Differences in View (79018). Ills. 3500 w. Eng News-Rec—May 31, 1917. Rail fractures reduced one-half in two years. Bending test proposed in place of drop test

Broad Rails versus Deep Rails (80129 B). George H. Barbour, with discussion. Ills. 52 pp. Engrs' Soc W Penn, Pro—July, 1917. Theoretical discussion.

History of the Development of Rail on the Baltimore & Ohio Railroad (80130 B). Earl Stimson. Ills. 40 pp. Engrs' Soc W Penn, Pro—July, 1917.

Rail Inclination, Wheel-Coning and Tie Plates (80140). F. H. Frankland. Ills. 900 w. Eng & Con—July 25, 1917. How to obtain the most satisfactory results.

Testing Rails by the Quick-Bend Method (81000). Ills. 1000 w. Ry Age Gaz—Sept. 7, 1917. Apparatus recently built by the Penn. R. R. to replace the drop test.

Split Head and Internal Stresses in Rails (81791). Ills. 4000 w. Ry Rev—Oct. 13, 1917. Examination of a broken rail after 30 yrs. of service. Comparisons of stresses in rails of different weight.

Intorno Allo Scorrimento Dei Binari (82007 B). L. C. Ettore. Ills. 5600 w. Mon Tec—Aug. 30, 1917. Serial, 1st part. Creeping of rails on curves and tangents.

**Railway Junction**

Winnipeg and Port Arthur Are Natural Junction Points (79771). Jas. H. Kennedy. 2500 w. Can Engr—July 5, 1917. Review of the Canadian railway situation and the various solutions.

**Railway Materials**

A Review of the Material Situation (79534 B). 5000 w. Ry Age Gaz—June 22, 1917. (Special No.) Need of supplies for the maintenance of way and structures.

**Rail Wear**

L'Usure Ondulatoire Des Rails (76252 B). 1000 w. La Nat—Dec. 30, 1916. Discussion of an undulatory effect observed in the wear of rails.

**Reclamation Plant**

Dope Renovating and Oil Reclaiming Plant, Southern Railway, Knoxville, Tenn. (79250). Ills. 1000 w. Ry Rev—June 16, 1917. Plant and processes recently installed.

**Repair Shops**

De Nieuwe Centrale Werkplaats der Nederlandsch - Indische Spoorweg te Djocja (80013 B). C. W. Herweijer. Ills. 3900 w. Ingr—June 2, 1917. Main repair shops of the Dutch East India Railways at Djocja.

**Restoration**

Restoration of Washed-Out Bridges on the Southern Railway (76803). Ills. 1500 w. Ry Rev—Feb. 17, 1917. Details of the work.

**Roadway**

Report of Committee I—On Roadway (77295 C). 45 pp. A R E A Bul—Feb., 1917.

Roadway (81251 C). 24 pp. Am Ry Eng Assn, Bul—July, 1917. Recommendations of Committee for the selection of important equipment.

**Scrap**

Reclamation in the Track and Mechanical Departments of the Chicago Great-Western Ry. (78369). Ills. 1500 w. Ry Rev—Apr. 28, 1917. Methods of sorting scrap material.

Reclaiming the Scrap Pile (80166 A). R. P. Crawford. Ills. 1000 w. Ind Man—Aug., 1917. Conservation and use of scrap material on the railways.

**Shipping Shed**

Lancashire and Yorkshire Railway Shipping Shed at Goole (80400 A). Ills. & Plates. 2000 w. Engng—July 20, 1917. Details of design and equipment provided.

**Shop Practice**

Machine Tool Practice in Railway and Locomotive Shops (76547 A). 2500 w.

Ry Gaz—Jan. 19, 1917. Feature prospects.

Machine Tool Practice in Railway and Locomotive Shops (76848 A). 2500 w. Ry Gaz—Feb. 2, 1917. Machining carriage and wagon axles and wheel centers.

The Ralston Steel Car Shop (76528 A). Ills. 1700 w. Ry & Loco Eng—Feb., 1917. Continuous method of assembling.

Wheel Shop Practices, Minneapolis, St. Paul & Sault Ste. Marie Ry., Minneapolis, Minn. (79252). Ills. 3000 w. Ry Rev—June 16, 1917 Facilities and methods for expeditious handling of car wheels and axles for a large railway system.

**Shops**

New Haven Shops for Electrical Equipment (77373). Ills. 2200 w. Ry Age Gaz—March 16, 1917. Facilities at Van Nest, N. Y., for making repairs to electric locomotives and motor cars.

New Locomotive Shops for the Burlington (77026). Ills. 1500 w. Ry Age Gaz —March 2, 1917. Enlarged facilities.

Economics of the Shop Power House (78547 A). V. T. Kropidlowski. 2500 w. Ry Mech Engr—May, 1917. Serial, 1st part. Merits of the shop power plant as opposed to the central station as a source of power.

The Government White Elephant at Quebec (78626). C. V. Johnson. Ills. 3500 w. Can Engr—May 10, 1917. Plea for government to make use of the fine N. T. R. shops which are well fitted for the manufacture of munitions.

**Shop Tools**

Developments in Railway Shop Tools (79283 A). 2500 w. Ry Mech Engr—June, 1917. Important recent improvements.

Milling Machines in Railroad Shops (79287 A). Harvey DeWitt Wolcomb. 1500 w. Ry Mech Engr—June, 1917. Classes of work for which they are fitted.

**Signal Lamps**

Signal Lamps with Reflectors (78856). Ills. 1200 w. Ry Age Gaz—Apr. 27, 1917. Electric signal lamps in use of N. Y. division of N. Y., N. H. & H.

**Snow Fighting**

Bucking the Big Drifts in Wyoming (77212). J. Cecil Alter. Ills. 1500 w. Eng News—March 8, 1917. How Feb. snows were met by Rocky Mt. railways.

Protecting a Line from Snow Troubles (77500). Ills. 1400 w. Ry Age Gaz—March 23, 1917. Precautions on the Southern Pacific.

**Southern Railway**

Double-Track Construction on the Southern Railway (77422). Ills. 5500 w. Ry Rev—March 7, 1917. Features of work on about 200 miles.

**Sprinklers**

Automatic Sprinklers for Freight Houses (76482). Ills. 1000 w. Ry Age Gaz—Feb. 2, 1917. Fire protection in freight houses of the Pennsylvania R. R.

**Stations**

Oldham-Road Goods Station, Manchester; Lancashire and Yorkshire Railway (77245 A). Plates. 3000 w. Engng—Feb. 23, 1917. Reconstruction.

New Union Passenger Facilities at Macon (77696). Ills. 3500 w. Ry Age Gaz —March 30, 1917. Includes station building, track layout, construction of approaches, etc.

New Union Station Plans Completed for St. Paul (78783). Ills. 2500 w. Ry Age Gaz—May 18, 1917. Details of revised design.

A New Passenger Station at Danville, Ill. (80866). Ills. 1600 w. Ry Age Gaz —Aug. 31, 1917. Novel features of the Chicago & Eastern Illinois structure.

**Structures**

Report of Committee XV—On Iron and Steel Structures (77518 N). 33 pp. A R E A, Bul—March, 1917. Protection against corrosion; impact tests; floors, etc.

**Tanks**

Efficient Type of Bottom for Railway Water Tank (79056 A). Ills. 1400 w. Ry & Loco Eng—June, 1917. Advantages of steel construction; increased storage capacity of elliptical bottom.

**Terminals**

Lackawanna Terminal Improvements at Buffalo (76619). Ills. 2200 w. Ry Age Gaz—Feb. 9, 1917. Two-level station, serving both rail and lake carriers.

New Ocean Terminals at Halifax (78928). Ills. 3000 w. Ry Rev—May 26, 1917. Serial, 1st part. From a paper by A. C. Brown, before Can. Soc. of Civ. Egrs. Concrete shell construction of piers is particularly interesting.

Terminal Costs and Rates (79127 A). Robert J. McFall. 13 pp. Af Eng Soc of Minn, Bul—June. 1917. Methods of rate making; effect of neglect of cost in making terminal rates.

New Passenger Terminal of the D., L. & W. R. R. at Buffalo (81130). Ills. 1300 w. Ry Rev—Sept. 15, 1917. Detailed description.

**Ties**

The Grouping of Ties for Treatment (76007 N). Carlile P. Winslow. Ills. 1200 w. Am Wd Pres Assn—Jan., 1917. Results of tests.

Report of Committee III—On Ties (76795 C). Ills. 65 pp. A R E A, Bul—Jan., 1917. Effect of design of tie plates and track spikes, etc.

From Tree to Track (77937). J. H. Waterman. 20 pp. St L Ry Cb, Pro—March 9, 1917. Preservation of timber for ties and matters related. Methods of treatment.

**Timber**

Timber Protective Methods on the Santa Fe (75732). Ills. 3800 w. Ry Age Gaz—Jan. 5, 1917. Methods by which tie requirements have been reduced 650,000.

Notes on Sleepers and Permanent Way Timber (80467 N). Arthur G. Pugh. 13 pp. Per-Way Instn, Jl—April, 1917. The supply of timber, need of conservation, and suggestions for its economical use for railways.

**Track Depression**

Dragline Used Successfully in Track Depression (81771). Ills. 2000 w. Ry Age Gaz—Oct. 12, 1917. Methods used in lowering a line in Cleveland.

**Track Devices**

Rail-Chairs and Tie-Plates on the Northern Pacific Ry. (77335). Ills. 1000 w. Eng News—March 15, 1917. Tests made with new track devices.

**Track Elevation**

Pennsylvania Track Elevation at Johnstown, Pa. (78605). Ills. 3000 w. Ry Age Gaz—May 11, 1917. Interesting problems in handling heavy work under dense traffic.

**Tracks**

Double-Track Work on a Busy Section of the Erie Railroad (76570). Ills. 3100 w. Eng ews—Feb. 8, 1917. Grading methods and new structures.

Report of Committee IX—On Signs, Fences, and Crossings (76563 C). Ills. 60 pp. Am Ry Eng Assn, Bul—Dec., 1916.

Report of Committee V—On Track (76793 C). 37 pp. A R E A, Bul—Jan., 1917. Diagrams, maps, tables, and studies.

Punched Out Track Signs on the Canadian Pacific Railway (76564 C). J. W. Orrock. Ills. 1100 w. Am Ry Eng Assn, Bul—Dec., 1916. Describes various signs aiming at economy.

Track Drainage (77773 A). Kenneth L. Van Auken, with discussion. Ills 24 pp. West Ry Cb, Pro—Feb. 19, 1917. How to prevent subsidence of the ballast into the subgrade.

Methods and Cost of Changing 17 Miles of Railroad Track from Narrow Gage to Standard Gage (78697). Henry R. Somers. Ills. 3000 w. Eng & Con—May 16, 1917. Road from Wilmington, Vt., to Hoosac Tunnel Station.

Second Track Work on the Union Pacific (80680). Ills. 2500 w. Ry Age Gaz—Aug. 24, 1917. Heavy grade revision in eastern Utah.

Maintenance of Track in Large Terminals (81330). C. J. Coon. 1600 w. Ry Rev—Sept. 22, 1917. Faults of most terminals, with suggestions for better maintenance.

Labor Saving Equipment for Track Work on Illinois Central R. R. (81875). E. J. Boland. 2000 w. Eng & Con—Oct. 17, 1917. Describes devices employed on this road.

**Track Scale**

A Two-Section Plate Fulcrum Track Scale (77186). J. H. A. Bousfield. Ills. 2500 w. Ry Age Gaz—March 9, 1917. Innovation in weighing mechanisms installed at Pitcairn, Pa.

**Tree Planting**

Trees Planted by New Machine Replace Railway Snow Fences (77342). Hugh Smith. Ills. 900 w. Eng News—March 15, 1917. Machine used by Minneapolis, St. Paul & Sault Ste. Marie R. R.

**Tunnels**

The Longest Railway Tunnel in America (76755). Ills. 5000 w. Ry Age Gaz—Feb. 16, 1917. Five-mile bore of the Canadian Pacific, built in 3½ years.

Ventilation of the Connaught Tunnel (77507 A). J. G. Sullivan. Ills. 1000 w. Corn C E—Feb., 1917. Method of operation, and plan of ventilation.

Connaught Tunnel on the Canadian Pacific, Through the Selkirk Range of the Rocky Mountains (77741 A). Ills. 1500 w. Ry & Loco Eng—April, 1917. Details of construction.

The Mount Royal Tunnel (79707 A). H. K. Wicksteed. Ills. 2000 w. Ry & Loco Eng—July, 1917. Information concerning this tunnel at Montreal and its electrification.

**Water Service**

Report of Committee XIII—On Water Service (76796 C). 30 pp. A R E A, Bul—Jan., 1917. Wells, reservoirs, water softeners, etc.

**Water Supply**

Railway Water Supply (78740 A). C. R. Knowles, with discussion. Ills. 35 pp. N Y Rd Cb, Pro—Apr. 20, 1917. Facts concerning the supply, its importance, cost, etc.

**Welding**

Electric Arc Welding in Railroad Shops (81887 A). Charles H. Florandin, with discussion. Ills. 27 pp. N Y Rd Cb, Pro—Sept. 21, 1917. Work and methods.

**Yards**

Report of Committee XIV—On Yards and Terminals (77298 C). 50 pp. A R E A Bul—Feb., 1917.

Standardizing Car-Yard Layouts in Detroit (77641). Ills. 1500 w. Elec Ry Jl—March 24, 1917. Systematic programme of yard improvements.

Montowese Classification Yard, New York, New Haven and Hartford R. R. (81131). 1200 w. Ry Rev—Sept. 15, 1917. Outlines a project for large freight classification.

Pennsylvania Builds Hump Yards at Indianapolis (82066). Ills. 2500 w. Ry Age Gaz—Oct. 26, 1917. Modern classification and engine terminal facilities provided. Extensive drainage system.

**Zurich**

Genereller Erweiterungs-Entwurf für den Hauptbahnhof Zürich der S. B. B. (75562 B). Ills. 1400 w. Schweiz Bau—Nov. 11, 1916. Enlargement of railway station, yards and approaches at Zurich, Switzerland.

## ROADS AND PROJECTS

**Africa**

Construction and Working of Railways in South-West Africa During Military Operations and Since Surrender of German Forces (76137 A). Map. 8000 w. Ry Engr—Jan., 1917. Extract from report of W. W. Hoy.

Report of Major A. J. Beaton, S. A. Engineer .Corps, on New Railways and Reconstruction of Damaged Lines in South-West Africa (77004 A). 6000 w. Ry Engr—Feb., 1917.

**Alaska**

Alaskan Mineral Region Tapped by Government Railroad (78364). S. M. Soupcoff. Ills. 1800 w. Eng & Min Jl Apr. 28, 1917. Outline of mineral prospects and possibilities.

**Albania**

The First Railroad in Albania (81003). Ills. 1500 w. Ry Age Gaz—Sept. 7, 1917. Amount of conditions in Albania, and the work of the Italian army since the war.

**Argentine Republic**

The Railways of the Argentine Republic (76546 A). F. Lavis. Ills. & Map. 1800 w. Ry Gaz—Jan. 19, 1917. Serial, 1st part. Ownership, statistics, construction, etc.

**Asia Minor**

Les Chemins De Fer De La Turquie D'Asie (81406 B). C. Rabot. Ills. 5600 w. La Nat—Sept. 8, 1917. Mileage and location of railways in Asiatic Turkey. Effects of the war.

**Australia**

The Australian Trans-Continental Railway (79594 A). 1500 w. Engr—June 8, 1917. Information from report of Norris G. Bell showing progress to June 30, 1916.

Railway Across Australia (81415). Ills. 1400 w. Times Eng Supp—Aug. 31, 1917. Line practically completed from Port Augusta to Kalgoorlie, about 1,100 miles.

**Balkan Railways**

La Sistemazione Ferroviazia Nella Balcania Occidentale (79400 C). U. Leonesi. Ills. 10500 w. Ingeg Ferro—Apr 30 and May 15, 1917. Railway routes and systems of Albania, Serbia and adjacent countries.

**Baltimore**

Pennsylvania Changes at Baltimore Under Discussion Again (78511). Ills. 1800 w. Eng News-Rec—May 3, 1917. Improvements proposed.

**Canada**

Is Intercolonial's Failure Due to Low Rates? (75327). Francis A. Bonner, with editorial. 5500 w. Ry Age Gaz—Dec. 15, 1916. Losses are due to management.

**China**

Les Chemins De Fer Chinois (75600 B). P. Calfas. Ills. 5600 w. Gen Civ—Dec. 9, 1916. Location, mileage, traffic, etc., of Chinese railways.

Les Chemins de fer Chinois (76226 C + D). A. J. H. Charignon. 1500 w. Soc Ing Civ Fr—Dec. 1, 1916. History, development, cost, traffic and prospects.

Les Chemins De Fer Chinois (78850 C + D). A. J. H. Charignon. Ills. 5600 w. Soc Ing Civ Fr—Dec., 1916. Existing railway lines and projected construction.

The German Railway Record in China (79313 A). 2500 w. Engng—June 1, 1917. Information concerning construction, cost, management, etc.

Les Chemins De Fer Chinois (80030 B). A. Breton. Ills. 1800 w. La Nat—July 7, 1917. Existing lines and rolling stock, and extensions projected.

**Connecting R. R.**

South End of the New York Connecting Railroad (80184). Ills. 3000 w. Ry Age Gaz—July 27, 1917. Details of the four-mile line being built for freight interchange between the Pennsylvania and the New Haven lines.

**Cut-Off**

The Castleton Cut-Off, New York Central R. R. (76804). Maps & Ills. 1200 w. Ry Rev—Feb. 17, 1917. Includes a new high bridge over the Hudson, near Albany, and 20 miles of connecting railroad.

**England**

Great Western Railway Developments in Birmingham (76550 A). Ills. & Plates. 2000 w. Engng—Jan. 19, 1917. Serial, 1st part. Details of the Moore street passenger and goods stations.

Enfield-Stevenage New Line (80039). 1000 w. Times Eng Supp—June 29, 1917. Improvements under way on Great Northern and Great Central Railways. Tunnels, viaducts, realignment, etc.

**England-Russia**

Une Future Transversale Entre La Grande-Bretagne Et La Russia (77589 B). C. Rabot. Ills. 2200 w. La Nat—Feb. 17, 1917. Scheme for connecting London and Petrograd by rail through Scandinavia and car ferries across the North and Baltic seas.

**France**

Les Chemins De Fer Français (81410 B). J. Trérières. 3600 w. Gen Civ—Sept. 1, 1917. Serial, 1st part. French railways, their present status and their outlook for the future.

**Grading**

Heavy Grading on 50-Mile Southern Relocation (75166). Ills. 3100 w. Eng News—Dec. 7, 1916. Striking items in 9,000,000-yard grading, mainly in North Carolina and Georgia.

**Hamilton, Ont.**

Loop Station and One Right of Way at Hamilton (79994). Abstract of report by W. F. Tye and N. Cauchon. Map. 3000 w. Can Engr—July 19, 1917. Plan advocated as solution of railway problem.

**India**

Improvements on the Bombay, Baroda and Central India Railway (75127 A). 2500 w. Ry Gaz—Nov. 17, 1916. New bridges, yards, workshops, etc.

State Engineering in India (78873). 1700 w. Times Eng Supp—Apr. 27, 1917. Projected railways, irrigation works and canals.

**Indiana**

New Railway in Indiana for the Pennsylvania System (75326). Ills. 2700 w. Eng News—Dec. 14, 1916. 41-mile line from Indianapolis to Frankfort.

**Indo-Ceylon**

Physical Features of Adam's Bridge (76982). 1200 w. Times Eng Supp—Jan. 26, 1917. Considerations that will affect the construction of a railway from India to Ceylon.

**Japan**

The Progress of the Japanese Railroads (81770). Sukehiko Goto. Map & Ills. 4000 w. Ry Age Gaz—Oct. 12, 1917. Serial, 1st part. Development, and account of organization, traffic, rates, etc.

**Location**

Report of Committee XVI—On Economics of Railway Location (77296 C). 7 pp. A R E A Bul—Feb., 1917.

**Low-Grade Line**

Construction of a Comprehensive Low-Grade Line (78516). Ills. 2000 w. Ry Age Gaz—May 4, 1917. The Seaboard Air Line from Hamlet, N. C., to Savannah, Ga.

**Mesopotamia**

A Great Railway Scheme (76176 A). Francis Aldridge. Map & Ills. 2000 w. Cas Eng Mthly—Jan., 1917. Trans-Mesopotamian railways proposed.

**Mountain Railway**

La Funicolare Engelberg-Gerschnialp (80017 C). Ills. 1000 w. Ingeg Ferro—June 30, 1917. An inclined cable railway in Switzerland, which rises 900 ft. in 1566 ft. length.

**New Line**

Williamette Pacific Railroad; A New Line Through the Coast Range (75919). W. P. Hardesty. Ills. 3200 w. Eng News—Jan. 11, 1917. Details of line.

**New York**

West Side Improvement and New York's Commerce (76287 B). Robert A. C. Smith. 11 pp. Mun Engrs Jl—Jan., 1917. Summary of a volume addressed to the N. Y. Chamber of Commerce.

**Railway Scheme**

By Rail from the North Sea to the Persian Gulf (79942 A). 2500 w. Engng—June 22, 1917. Discusses this German scheme.

**Railway Transport**

The "Railification" of the Front (77242 A). 2000 w. Ry Gaz—Feb. 23, 1917. How the importance of railway transport increase with the war.

**Roadbeds**

Queen & Crescent Has Carried Out Extensive Program to Improve Drainage of Roadbed (74708). J. T. Bowser. Ills. 1800 w. Eng Rec—Nov. 18, 1916. Details of work.

**Russia**

Les Chemins De Fer Projetés dans la Russie septentrionale (74910 B). Ills. 3800 w. Gen Civ—Nov. 11, 1916. Projected extensions of Russian railways to Arctic points.

Les Chemins De Fer Russes Et La Guerre (75589 B). 2600 w. Gen Civ—Dec. 2, 1916. Present extent, mileage, etc.

**St. Paul Belt**

Work Started on New Belt Line Around St. Paul (79996). Maps. 1500 w. Ry Age Gaz—July 20, 1917. Hill lines under construction for handling interchange traffic.

**Saskatoon**

Proposed Union of Railway Lines at Saskatoon (81098). C. J. Yorath. 900 w. Can Engr—Sept. 13, 1917. From special report on the railway situation.

**Stations**

General Track and Building Plan for Chicago Union Station Is Made Public (74409). Ills. 2500 w. Eng Rec—Nov. 4, 1916. Two sets of steel tracks running each way from concourse. All facilities for public on one level.

New Union Passenger Facilities at Dallas (74668). Ills. 3000 w. Ry Age Gaz—Nov. 17, 1916. Layout to replace five old stations.

Progress on the New Chicago Union Station (74385). Ills. 3500 w. Ry Age Gaz—Nov. 3, 1916. Preliminary construction well under way.

**Switzerland**

The Misox Railway (75402 A). S. Berg. Map & Ills. 2500 w. Engr—Dec. 1, 1916. Serial, 1st part. Details of a railway in Switzerland.

**Tabora**

La Ferrovia Da Tabora Al Lago-Tanganica (76212 B). E. Gerli. 2400 w. Mon Tec—Nov. 30, 1916. Description of railway in East Africa.

**Terminal Railways**

Layout of a Modern Public Terminal Railway (82022). R. Bridges. 3200 w. Naut Gaz—Sept. 27, 1917. Excerpts from address before Am'n Assoc. of Port Authorities at Cleveland.

**Terminals**

Michigan Central New Passenger Terminal, Detroit (74560 A). Ills. 1500 w. Ry Gaz—Oct. 27, 1916. Serial, 1st part. Details of building and station facilities.

Engine Terminal and Coach Yard, Baltimore & Ohio C. T. R. R., Chicago (75026). Ills. 3000 w. Ry Rev—Dec. 2, 1916. Unusually compact and complete facilties.

Pennsylvania Freight Terminal at Chicago Striking in Both Size and Appearance (74537). Ills. 1200 w. Eng Rec—Nov. 11, 1916. Five-story structure, with tower, ocupying entire block.

**Tunnels**

A 30-Mile Railway Tunnel Under the Cascade Mountains (74662). H. M. Chittenden. Ills. 3000 w. Eng News—Nov. 16, 1916. Advantages of tunnel route with cost data.

**Turntable**

Drawbridge-Type Locomotive Turntable 100 Ft. Long (74367). Ills. 1800 w. Eng News—Nov. 2, 1916. End-supported turntable that does not tilt.

**Wheel Turning**

Wheel Turning in Railway and Locomotive Shops (74476 A). 2500 w. Ry Gaz—Oct. 20, 1916. Serial, 1st part. Reviews improvements in methods.

# TRAFFIC

**Car Interchange**

Some Constructive Thoughts on Car Interchange (79999). Samuel G. Thomson. 2000 w. Ry Age Gaz—July 20, 1917. Mechanical, financial, and operating aspects should be considered.

Car Interchange (79822). Charles Burlingame. 1500 w. St L Ry Cb, Pro—June 8, 1917. Suggests establishment of a car owning company which would rent equipment to all railroads.

**Car Service**

Work of the Commission on Car Service (79533 B). 5500 w. Ry Age Gaz—June 22, 1917. (Special No.). Methods of regulating the freight equipment of the railroads as a pool.

**Car Shortage**

Heavier Car Loading Would Eliminate Car Shortage (79527 B). Ills. 4500 w. Ry Age Gaz—June 22, 1917. (Special No.) Co-operation necessary.

**Coal Transport**

Coal Transport Re-organization Scheme (80388 A). 7000 w. Colly Gdn—July 13, 1917. Text of an Order of the Board of Trade, with editorial comment and criticism.

**France**

Rates and Wages on the French Railways (76384 A). 3000 w. Engng—Jan. 12, 1917. Editorial on passenger and goods rates, wages, and related topics.

**Freight**

Revision of Billing at Large Terminal Points (75923). A. P. Ottarson. 1700 w. Ry Age Gaz—Jan. 12, 1917. Economical and satisfactory.

Statistics Show Increase of Freight Car Efficiency (76279). 2500 w. Ry Age Gaz—Jan. 26, 1917. Year 1916 breaks record of average miles per car per day.

Increasing the Tonnage of Freight Trains (79884). 6000 w. Ry Age Gaz—July 13, 1917. Important principles emphasized in six discussions received in a contest.

Heavier Car Loading Is Winning Out (79883). Ills. 3800 w. Ry Age Gaz—July 13, 1917. Methods which are proving successful.

Lessons from the Freight Congestion (80188). J. E. Campbell. 1800 w. Ry Age Gaz—July 27, 1917. Conditions and their causes and remedies.

Freight Loss and Damage on the M. K. & T. Ry. (80643). 4800 w. Ry Rev—Aug. 18, 1917. From report of J. W. Kendrick on the possibility of operating more advantageously.

Methods of Loading, Bracing and Stowing L. C. L. Freight, Atchison, Topeka & Santa Fe Railway (81329). Charles E. Parks. Ills. 1000 w. Ry Rev—Sept. 22, 1917. Serial, 1st part. Report of investigations and resulting recommendations.

Cause and Prevention of Astray Freight (81792). J. J. Quirk. 2000 w. Ry Rev—Oct. 13, 1917. Analyzes some of the causes of difficulties in the freight claim department. Corrective measures are outlined.

**Freight Cars**

The Freight Car Situation and Its Probable Solution (78691). J. A. Somerville. 10 pp. St L Ry Cb, Pro—Apr. 13, 1917. Car service rules and the matter of heavier loading.

**Handling Explosives**

Safety in handling Explosives or Other Dangerous Articles (79899). W. S. Topping. 4500 w. Ry Rev—July 14, 1917. Read before the Car Foremen's Assn. The manner in which trouble is most likely to arise and the preferred plan of attack.

**Holland**

Enkele Opmerkingen over de Belasting Onzer Spoorwegen (82011 B). P. A. Arriëns. Ills. 14000 w. Ingr—Aug. 25, 1917. Some observations on the handling of traffic on Dutch railways.

**Interchange**

Annual Report of the Standing Committee on Rules of Interchange (78389 A). 15 pp. Cen Ry Cb—Mar. 8, 1917. With short discussion.

Annual Report of the Standing Committee on Revision of M. C. B. Rules of Interchange (78688 A). 25 pp. Ry Cb Pitts, Pro—Mar. 23, 1917. Recommended changes.

**Mail Rates**

Postmaster General Asks Reduction in Mail Pay Rates (77372). 2500 w. Ry Age Gaz—March 16, 1917. Reviews recent statement of the postmaster general, with reasons for reduction of rates.

**Military Traffic**

Transportation of Military Traffic (79529 B). 3000 w. Ry Age Gaz—June 22, 1917. (Special No.) Facts illustrating volume of additional business.

**Pooling**

An Analysis of the Tidewater Pooling Plan (79637). 1600 w. Cl Age—June 30, 1917. Outlines the general scope of the plan and sentiments regarding it.

Federal Trade Commission Recommend Government Pooling of Transportation and Coal (79624). 3000 w. Ry Age Gaz—June 29, 1917. Recommends a pool in the hands of a governmental agency.

**Railroad Operation**

Statistical Control of Railroad Operations (77617 A). F. Lincoln Hutchins. 1500 w. Ind Man—April, 1917. Recommends that statistics be compiled in graph form.

**Rates**

Railroads Open Campaign for Rate Advances (77768). 3500 w. Ry Rev—March 31, 1917. Movement to revise freight rates.

Les Tarifs Des Chemins De Fer Français (78280 B). P. Mallet. 5600 w. Gen Civ—Mar. 24, 1917. Necessity of increased rates for French railways.

Carriers Present Evidence in Rate Case (78602). 12500 w. Ry Age Gaz—May 11, 1917. Testimony of railway executives regarding increases in expenses and need of improving credit conditions.

Carriers Present Evidence in Rate Case (78734). 6000 w. Ry Age Gaz—May 18, 1917. Concluding testimony on behalf of railways.

Business Sense and Railroad Rates (79357 A). 1000 w. E Cb Balt, Jl—June, 1917. Present conditions from the view of business fairness.

Rate Advance Hearings Completed (79247). 7500 w. Ry Age Gaz—June 15, 1917. Final arguments.

Decision in Transcontinental Rate Case (80186). 6500 w. Ry Age Gaz—July 27, 1917. Abstract of the commission's decision.

General Rate Advance Refused by Commission (79739). Also editorial. 10700 w. Ry Age Gaz—July 6, 1917. Denies general 15 per cent. advance in freight rates. Increase on coal, coke and ore and in water and rail rates.

**Rules**

A Proposed Code of Car Service Rules (82067). 4000 w. Ry Age Gaz—Oct. 26, 1917. Regulations for interchange of freight equipment to correct present deficiencies.

**Terminals**

Speeding Up the Operation of Terminals (79546 B). Ills. 2500 w. Ry Age Gaz—June 22, 1917. (Special No.) Need highest efficiency in yard work to prevent traffic blockades

**Tonnage**

Operating Conditions Affecting Tonnage (78150). 4000 w. Ry Age Gaz—April 20, 1917. Discussion of principles.

Operating Conditions Affecting Tonnage (78517). 1800 w. Ry Age Gaz—May 4, 1917. Abstract from second of two papers on this subject. Some of the factors affecting train loading and allowances necessary.

Full Cars Are Essential for Train Loading (80684). 3500 w. Ry Age Gaz—Aug. 24, 1917. Five discussions by different authors on basic principles underlying the securing of better loading and heavier tonnage.

**Train Loads**

How One Road Increased Its Train Load (80316). J. Lowell White. 1800 w. Ry Age Gaz—Aug. 3, 1917. Ratings established by road tests.

Increasing the Train Load (80440). E. H. Shaughnessy. W. S. Hanley. Charles Burlingame. 1800 w. St L Ry Cb, Pro—July 13, 1917. Three short papers by authors named.

Practical Ways of Increasing Train Loading (81102). 3500 w. Ry Age Gaz—Sept. 14, 1917. Several short papers on method of promoting economy of operation.

The Handling of Less-Than-Carload Freight in Warehouses and on Platforms on the M. K. & T. Ry. (80899). 4000 w. Ry Rev—Sept. 1, 1917. Critical review of facilities and methods. Arrangements at various stations.

**Transportation Problems**

Traffic Capacity Factors and Their Limitations for Maximum Traffic on Steam and Electric Railways (78446 A). Walter V. Turner. 2300 w. Ry & Loco Eng—May, 1917. Value of an efficient brake in solving the transportation problem.

## MISCELLANY

**Canada**

Canada's Railway Problem and Its Solution (76496). William Francis Tye. Abstract of paper before Can. Soc. Civ. Engrs. 2200 w. Can Engr—Feb. 1, 1917. Serial, 1st part. Study and conclusions.

Canada's Railway Problem and Its Solution (77145 N). W. F. Tye. Diagrams and Maps. 36 pp. Can Soc Civ Engrs—Jan. 18, 1917. Conclusions as result of careful study of the unsatisfactory financial conditions.

**Construction**

Railway Construction Statistics for 1916 (75504). 6000 w. Ry Age Gaz—Dec. 29, 1916. Mileage greater than last year.

**Efficiency**

Railroad and Industrial Efficiency in War (79531 B). A. L. Humphrey. 2000 w. Ry Age Gaz—June 22, 1917. (Special No.) How to use forces and equipment most effectively.

**European Railroads**

Europe's Railroads Meeting Second Great Trial (79554 B). 3800 w. Ry Age Gaz—June 22, 1917. (Special No.). All countries have raised rates and cut commercial service. Serious Russian situation.

**Food Problem**

Railways and Food Problem in the War (79538 B). Ills. 5500 w. Ry Age Gaz—June 22, 1917. (Special No.) Right-of-way gardens, demonstration trains, seed and labor bureaus, etc.

**Government Ownership**

Further Views on Government Ownership in Canada (76481). J. L. Payne. 2500 w. Ry Age Gaz—Feb. 2, 1917. Reply to articles regarding results of state management of the Intercolonial Ry.

**Legislation**

State Railroad Legislation in 1916 (75025). 1500 w. Ry Age Gaz—Dec. 1, 1916. Abstracts of statutes passed by eight legislatures.

**M. K. & T.**

Kendrick Report on the Missouri, Kansas & Texas (77031). 3500 w. Ry Age Gaz—March 2, 1917. Conclusions after a study of the property and possibilities of economies.

**Mobile Artillery**

Use of Heavy Artillery on Railway Cars and Auto Trucks in the European War (76790 B). Frank T. Hines. Ills. 5000 w. U S Art, Jl—Jan. Feb., 1917. Types used by the different nations.

**Modern War**

How Railways Behind the Front Make History (79553 B). Ills. 3000 w. Ry Age Gaz—June 22, 1917. (Special No.) Influence of the railways in the attack on Verdun, and important part played by light railways.

How Railways Have Revolutionized Warfare (79530 B). 7500 w. Ry Age Gaz—June 22, 1917. (Special No.). Use made of them in recent wars, and their present functions.

Use of railroads in War an American Development (79540 B). Map & Ills.

5500 w. Ry Age Gaz—June 22, 1917. (Special No.) Their use during the Civil War.

**Natural Resources**

Report of Committee XIX—On Conservation of Natural Resources (76798 C). 25 pp. A R E A, Bul—Jan., 1917. Tree planting, methods of lumbering and forestry, treated timber, coal, fuel oil, etc.

**Organization**

Report of Committee XII—On Rules and Organization (77514 N). Ills. 1000 w. A R E A, Bul—March, 1917. Conclusions, recommendations, etc., at recent meeting.

**Preparedness**

The Military Aspect of Railroad Preparedness (79544 B). B. F. Cheatham. 3000 w. Ry Age Gaz—June 22, 1917. (Special No.) Close co-operation between railroads and government necessary.

**Railroad Problems**

Some Business Aspects of the Railroad Problem (76671). Walker D. Hines. 3000 w. Ry Rev—Feb. 10, 1917. From address before Chamber of Commerce of the U. S., Jan. 31, 1917.

L'Adaptation Des Chemins De Fer à la lutte industrielle et économique (76938 B). J. Carlier. 3200 w. Gen Civ—Jan. 20, 1917. Serial, 1st part. How State operation of railways affects industry.

**Railroad Protection**

Methods Adopted to Protect Railroad Property (79552 B). Ills. 1700 w. Ry Age Gaz—June 22, 1917. (Special No.) Precautions to insure continuous operation.

**Railway Labor**

American Railway Labor's Part in the War (79536 B). 3500 w. Ry Age Gaz—June 22, 1917. (Special No.) Increasing its efficiency will help win victory. Difficulties to be overcome.

**Railway Supplies**

The Railway Supply Industry in the War (79556 B). Ills. 3000 w. Ry Age Gaz—June 22, 1917. (Special No.) Work of making munitions and building equipment

# STREET AND ELECTRIC RAILWAYS

**Accounting**

Anatomy of the Interurban Report (76676). F. W. Doolittle. 6500 w. Elec Ry Jl—Feb. 10, 1917. Explains development and methods of electric railroad accounting.

**Alberta**

One-Man Car Operation in Calgary, Alberta (81855). Thomas H. McCauley. Ills. 3000 w. Elec Ry Jl—Sept. 22, 1917. Municipal railway operates 42 reconstructed cars on one-man plan.

**Australia**

Rapid-Transit Plan for Sydney (77060). Ills. 3500 w. Elec Ry Jl—March 3, 1917. High-speed system including electrification of suburban steam service.

A Recent Australian Tramway (79774). Straun Robertson. Ills. 1000 w. Elec Ry Jl—July 7, 1917. Details of construction and equipment. Motors, cars, distribution system, etc.

**Bonding**

New Bonding Methods Developed for 150-lb. Third Rail (74928). Ills. 1500 w. Elec Ry Jl—Nov. 25, 1916. Types used by N. Y. Municipal Ry. Corporation.

**Boston Elevated**

Temporary Relief for Boston Elevated (76677). 3500 w. Elec Ry Jl—Feb. 10, 1917. Recommendations of special commission.

**Braking**

Regenerative Braking of Electric Vehicles (76300 D). R. E. Hellmund. Ills. 56 pp. A I E E, Pro—Jan., 1917. Problems met in applying regenerative control to electric railways.

**Buenos Aires**

Electric Traction In Buenos Aires (75581). 1000 w. Times Eng Supp—Nov. 24, 1916. Extensions, etc.

**Buffalo-Niagara**

Buffalo-Niagara Falls High-Speed Line (77059). Ills. 2000 w. Elec Ry Jl—March 3, 1917. New line on private way.

**Cable Road**

Die Drahtseilbahn Treib - Seelisberg (78272 B). H. H. Peter. Ills. 1400 w. Schweiz Bau—Mar. 17, 1917. Serial, 1st part. Swiss incline railway rising 1090 ft. in 3634 ft. Electric winding motors.

**Canada**

Canadian Experiences in War Time (78539). 3000 w. Elec Ry Jl—May 5, 1917. Effect on the electric railway industry.

Electric Railways in War Time (78613). Ills. 3500 w. Elec Ry Jl—May 12, 1917. Further comments on Canadian activities, with notes on conditions in the United States.

**Canadian Ry.**

War Checks the Growth of Calgary Street Railway (74405). Ills. 1200 w. Elec Ry Jl—Nov. 4, 1916. Economies effected by one-man cars and reducing schedules.

**Car Efficiency**

Modern Car Efficiency (74264 A). J. F. Layng. 2500 w. Gen Elec Rev—Nov., 1916. Arguments for replacing old equipment with new when economy can be secured.

**Car Equipment**

Equipment of the Light-Weight, Safety Cars (81357). Ills. 4000 w. Elec Ry Jl—Sept. 22, 1917. Details of equipment for one-man operation.

**Carhouse**

Springfield Street Railway Completes Model Carhouse (80773). Ills. 1800 w. Elec Ry Jl—Aug. 25, 1917. Design of new Hooker St. plant. Facilities, equipment and appliances.

**Cars**

Interurban Cars with Off-Set Central Vestibules (78752). Ills. 2000 w. Elec Ry Jl—May 19, 1917. High-speed cars for the Jamestown, Westfield and Northwestern R. R.

Car Weight Reduced by Steel Construction (74720). Ills. 1500 w. Elec Ry Jl—Nov. 18, 1916. New steel interurban passenger cars.

Equipment Details and Design of the New Rochester Car (75363). E. J. Cook. Ills. 1500 w. Elec Ry Jl—Dec. 16, 1916.

Petrol-Electric Cars on the Dublin and Blessington Tramway (77108 A). Ills. 2500 w. Tmwy & Ry Wld—Feb. 8, 1917. Details of cars capable of operating under their own power, or on trolley power.

Rebuilding Interurban Cars to Reduce Weight (81107). R. N. Hemming. Ills.

**ar Service**

1500 w. Elec Ry Jl—Sept. 15, 1917. Detailed drawings and data on various types of construction.

The "Quick Service Car" (81351). F. W. Hild. 3500 w. Elec Ry Jl—Sept. 22, 1917. Recommendations of this type of car for cities of medium and larger size, with suggestions.

**Car Service**

Operation of Frequent Service Cars in Large Cities (81354). J. C. Whirlwall. 10000 w. Elec Ry Jl—Sept. 22, 1917. Estimates based on actual cases showing there is a field for these cars.

**Car-Yards**

Typical Car-Yard Improvements at Rochester, N. Y. (79258). D. J. Graham Ills. 1000 w. Elec Ry Jl—June 16, 1917. Features of new shop and revised storage track layout.

**Chicago**

$96,871.300 Expenditure by 1926 Recommended for Chicago Traction (75192). Ills. 2500 w. Elec Ry Jl—Dec. 9, 1916. Report of Traction and Subway Commission outlining plans.

**Chicago Traffic**

Chicago Traffic, Value and Finances (77999). Charts. 2500 w. Elec Ry Jl—April 14, 1917. Methods used by Traction and Subway Commission in checking travel for unified system.

**Cincinnati**

Cincinnati's Rapid Transit Ordinance (77875). 4500 w. Elec Ry Jl—April 7, 1917. Concessions made by traction company in interest of civic development.

**Control**

Modern P. K. Control Equipments (81626). P. L. Mardis. Ills. 1200 w. Elec Jl—Oct., 1917. The scheme of operation and results.

The Success of Pneumatic Control (81609). Lynn G. Riley. 2000 w. Elec Jl—Oct., 1917. Development and advantages of the electro-pneumatic brake.

**Costs**

An Inexpensive Way of Cutting Construction Costs (78898). Frank B. Walker. 2500 w. Elec Ry Jl—May 26, 1917. Shows how co-operation among departments tends to eliminate waste.

How the Costs of Operation Are Steadily Mounting (79633). Ivy L. Lee. 3500 w. Elec Ry Jl—June 30, 1917. Data showing need of financial relief for electric railways.

**D. C. Railways**

Progress of High Voltage Direct Current Railways (74261 A). G. H. Hill. 1500 w. Gen Elec Rev—Nov., 1916. Characteristics that have led to its adoption for interurban and for steam railroad electrification.

**Electric Railways**

**Discipline**

Discipline in the Transportation Department (77230). H. A. Bullock. Abstract of paper read before N. Y. Elec. Ry. Assn. 3000 w. Elec Ry Jl—March 10, 1917. Principles that should underlie discipline.

**Door Control**

Montreal Adopts Air-Operated Doors and Steps (80597). Ills. 1500 w. Elec Ry Jl—Aug. 18, 1917. Details of door and step arrangements adopted and the advantages.

**Drainage**

How the Pacific Electric Solves Surface Drainage Problems (77401). Clifford A. Elliott. 1600 w. Elec Ry Jl—March 17, 1917. Culverts used interurban tracks and paved srteets.

**Drawbridge Accidents**

Electric Railway Drawbridge Safeguarding (75679). Frederick W. Johnson. 4000 w. Elec Ry Jl—Dec. 30, 1916. Exceptions to conclusions of investigating committee at Boston.

**Electricity**

Report of Committee XVI—On Electricity (76419 C). Ills. 25 pp. Am Ry Eng Assn, Bul—Nov., 1916. Supply, distribution, etc.

**Electric Railways**

Achievements and Prospects (74343 A). Charles L. Henry. 11 pp. A E R A—Oct., 1916. Review of conditions affecting the industry.

An Electric Railway Operating Under Steam Road Conditions (74721). A. Swartz. Ills. 1200 w. Elec Ry Jl—Nov. 18, 1916. Toledo & Western R. R.

Growth of Electric Railways (74344 A). Frank J. Sprague. Ills. 36 pp. A E R A—Oct., 1916. Reviews the physical development.

Up-State New York Lines Need Relief (79207). Thomas Conway, Jr. 2500 w. Elec Ry Jl—June 9, 1917. Serial, 1st part. Quantity and quality of service must be curtailed or higher fare secured.

Some Tendencies in the Electric Railway Industry (78008 A). Morris Buck. 2200 w. Sib Jl Eng—April, 1917. Advances that have proved profitable, and possible improvements.

The Problems of the Electric Railways (81777). L. S. Storrs. 2500 w. Elec Ry Jl—Oct. 13, 1917. Higher cost of labor and materials necessitates higher fares or reduced taxation, or both.

Mobilizing the Electric Railways for War (81914). 2500 w. Elec Ry Jl—Oct. 20, 1917. Important work accomplished.

**Electric Traction**

A Belgian Engineer's Ideas of Heavy Electric Traction in America (75044). 2000 w. Elec Ry Jl—Dec. 2, 1916. Prof. J. Carlier states that high-tension direct current is now leading, and compares it with single phase.

**Electrolysis**

Preliminary Report Prepared for Submission to its Principals by the American Committee on Electrolysis Appointed by National Engineering Societies and Other Interested Associations and Corporations (76420 C). 150 pp. Am Ry Eng Assn, Bul—Nov., 1916.

Electrolysis (78014 A). Joseph F. Putnam. Ills. 2000 w. Sib Jl Eng—April, 1917. Explanation of causes and remedies.

Street Railway Negative Return System for the Mitigation of Electrolysis (78227 N). L. A. Herdt and E. G. Burr. 15 pp. Can Soc C E—April 19, 1917. Various methods, with design of return system.

**Elevated Railways**

Elevated Railway Rebuilt—Without Stopping Traffic (78946). Ills. 2000 w. Eng News-Rec—May 17, 1917. Details of work in Chicago.

Reconstruction Executed Safely of Complicated Elevated Railway (79750). George D. Fried. Ills. 1000 w. Eng News-Rec—July 5, 1917. Replace 3-track structure to new grade and track alignment.

**Energy Saving**

Energy Saving on Street Railways (81895 A). A. M. Buck. 4000 w. Sib Jl Eng—Oct., 1917. Influence of variables on the energy consumption of street cars.

**Fares**

Pending Applications for New York Fare Increases (81780). Joseph K. Choate. 3000 w. Elec Ry Jl—Oct. 13, 1917. Résumé of work to impress the needs of this industry.

**Freight**

An Interurban Freight Line in the Farthest Northeast (74540). Ills. 2200 w. Elec Ry Jl—Nov. 11, 1916. Aroostook Valley R. R. handles lumber and farm products.

Freight Locomotives for the South Shore Lines (74542). Ills. 2500 w. Elec Ry Jl—Nov. 11, 1916. Single-phase locomotives designed for the service.

Utilization of Tramways for Goods Traffic (74474 A). G. W. Holford and W. Clough, with discussion. Read before Munic. Tram. Assn. Ills. 15500 w. Tmwy & Ry Wld—Oct. 12, 1916. English towns utilizing tramways for conveyance of goods, the conditions, working, etc.

Handling Freight on a Southern Line (77721). T. G. Brabston. Ills. 1500 w. Elec Ry Jl—March 31, 1917. Analysis of practices which have increased freight traffic.

Freight Haulage on the Cedar Valley Road (81622). A. B. Cole. Ills. 3000 w. Elec Jl—Oct., 1917. The traffic, facilities, service, equipment, construction, etc.

**Freight Terminals**

D. U. R. Triples Freight Handling Capacity (80476). Ills. 2500 w. Elec Ry Jl—Aug. 11, 1917. Details of new freight terminal in Detroit.

Joint Interurban Freight Facilities for Indianapolis (80477). Ills. 1200 w. Elec Ry Jl—Aug. 11, 1917. Details of a new freight terminal for busy interurban railways and the advantages secured.

**Freight Traffic**

"Better Service" Brings $70,000 Freight Business in Third Year (79773). J. F. Holman. Ills. 2000 w. Elec Ry Jl—July 7, 1917. Policies and methods employed by a western road to attract freight traffic.

Beginning the Freight Business Right (79908). Ills. 1500 w. Elec Ry Jl—July 14, 1917. Successful methods on the Cleveland, Southwestern & Columbus Railway.

**Frost Troubles**

Frost Causes Electric Railways' Hold-Up (76694 A). Ills. 1500 w. Ry Gaz—Jan. 26, 1917. Trouble on London transit facilities due to coating of ice on conductors.

**Headlights**

Headlights (75043). K. W. Mackall. Abstract of paper before C. E. R. A. Ills. 2000 w. Elec Ry Jl—Dec. 2, 1916. Practice and theory of illumination as applied.

Study and Comparative Tests of Electric Headlights (75681). R. N. Hemming. Ills. 2000 w. Elec Ry Jl—Dec. 30, 1916. Analysis of experiments.

**Illinois**

Development of Light-Weight Safety Car on Illinois Traction System (81356). Ills. 6500 w. Elec Ry Jl—Sept. 22, 1917. Considerations which led to the adoption of this type of car, and its development.

**Inspection**

Instructions for Inspecting Bridges and Culverts (78358). Frank B. Walker. 2500 w. Elec Ry Jl—Apr. 28, 1917. Importance of regular inspections, giving instructions based on experience.

Inspection System of the Ogden, Logan & Idaho Railway (81616). 1100 w. Elec Jl—Oct., 1917. System of records.

**Insurance**

Have Saved Railways Millions (76582 A). Harlow C. Clark. Ills. 13 pp.

A E R A—Jan., 1917. Insurance and electric railways. History and development of movement for better rates and better protection.

**Interurban**

The Future of the Interurban (77231). A. Benham. Abstract of address before Cent Elec Ry Assn. 1500 w. Elec Ry Jl—March 10, 1917. Suggestions for improvement of conditions.

New Kansas Interurban Line Serves Central Cities (79038). Ills. 1500 w. Elec Ry Jl—June 2, 1917. Arkansas Valley interurban railway.

Re-engineering on Interurban Line (81631). Ills. 3000 w. Elec Ry Jl—Oct. 6, 1917. Change from single-phase to 1200 volt d. c., from 90,000 lb. to 59,100 lb. cars, from generating station to purchased power, etc., in attempt to reduce operating expenses.

The Chicago, Lake Shore & South Bend Railway (81614). H. L. Kirker. Ills. 1200 w. Elec Jl—Oct., 1917. Details of property, peak loads, freight service, etc.

**Library System**

Library of an Electric Railway (76583 A). Lewis A. Armistead. Ills. 9 pp. A E R A—Jan., 1917. How the library of the Boston Elevated is used by its officials.

**London**

London's Traffic Problems (78037 A). 2500 w. Tmwy & Ry Wld—March 15, 1917. Remarks on the requirements and the favorable opportunity for action.

The Bakerloo-L. & N. W. Watford Extension (78566 A). Map & Ills. 1500 w. Elec Rev—Apr. 20, 1917. Describes the new through service trains.

**Maintenance**

Analysis of Track Maintenance Costs (77398). R. C. Cram. Ills. 2500 w. Elec Ry Jl—March 17, 1917. Data and deductions from the years' records in Brooklyn, N. Y.

Maintenances of Overhead on the Westchester (77397). Ills. 3500 w. Elec Ry Jl—March 17, 1917. Plan for minimizing inspection and reducing expense on important suburban line.

**Material Handling**

Handling Way Materials Economically (76355). A. E. Harvey. Ills. 2500 w. Elec Ry Jl—Jan. 27, 1917. Practice of Kansas City railways.

**Milan**

Sulla assunzione diretta del completo servizio tramviario da parte del Comune di Milano (77553 B). 4300 w. Mon Tec—Jan. 30, 1917. City tramways taken over by municipal governments in Milan, Italy.

**1916**

Retrospect and Prospect (75745). 15 pp. Elec Ry Jl—Jan. 6, 1917. Review of progress during the past year and the outlook.

**Paving**

Highway Paving by Street Railways (76878). W. R. Dunham, Jr. 1800 w. Elec Ry Jl—Feb. 24, 1917. Unreasonable burden.

**Paving Burden**

What Shall We do With the Paving Burden? (79392). R. C. Cram. Diagrams. 5000 w. Elec Ry Jl—June 23, 1917. Discusses the repaving situation and the injustice of the taxation.

**Passenger Traffic**

Some Notes on Passenger Transportation in Large Cities (74478 A). J. M. McElroy, with discussion. Read before Munic. Tram. Assn. Diagrams. 10000 w. Tmwy & Ry Wld—Oct. 12, 1916. Problems of railways and their solution.

**P. C. Control**

Recent Developments in Sprague General Electric PC Control (74262 A). F. E. Case. Ills. 1500 w. Gen Elec Rev—Nov., 1916. Different forms developed for equipments of various capacities.

**Power Plants**

Remodeling a Small Railway Power Plant (75191). Ills. 2200 w. Elec Ry Jl—Dec. 9, 1916. Holyoke street railway plant enlarged and improved.

**Power Stations**

New Power Station of Compact Design (75680). Ills. 2000 w. Elec Ry Jl—Dec. 30, 1916. The Fremont plant of Ohio State Power Co.

**Publicity**

Publicity and Good Public Relations (75746). 15 pp. Elec Ry Jl—Jan. 6, 1917. A symposium on publicity.

**Rail Bonding**

Rail-Bonding Precautions (78528). H. H. Febrey. Ills. 2000 w. Cl Age—May 5, 1917. Care necessary in bond installation.

**Railless Traction**

Present Status of Railless Traction (76049 A). Alexander Shapiro. Ills. 9 pp. A E R A—Dec., 1916. History of system, with its advantages and disadvantages.

**Rail Corrugation**

Rail Corrugation Studied in Chicago (74541). Ills. 2500 w. Elec Ry Jl—Nov. 11, 1916. Study and conclusions.

Reducing Load vs. Raising Yield Point as Rail Corrugation Cure (78859). Henry M. Sayers. Ills. 2000 w. Elec Ry Jl—April 28, 1917. Microscopic study.

**Rail Machine**

The Woods-Gilbert Rail Planer and Grinder (75120 A). Ills. 1200 w. Tmwy & Ry Wld—Nov. 9, 1916. Its work at Bexley.

**Rails**

Double Guards Reduce Cost (78897). William H. Stevenson. 1000 w. Elec Ry Jl—May 26, 1917. Guards on the outer rails of curves increase the life of rolling stock.

Flexion Des Rails De Tramway (80711 B). L. Tournayre. 3300 w. Gen Civ—July 14, 1917. Mathematical treatment of bending stresses in tramway rails.

Flexion Des Rails De Tramway (81405 B). P. Canfourier. Ills. 2400 w. Gen Civ—Aug. 25, 1917. Flexion of tramway rails. Mathematical treatment.

**Railway Motors**

A Diesel-Electric Combination for Rail Motor Cars (74472 A). Ills. 1200 w. Tmwy & Ry Wld—Oct. 12, 1916. Detailed description and results.

**Railway Power**

New Source of Power for Public Service Railway (79206). Ills. 2500 w. Elec Ry Jl—June 9, 1917. An example of the latest steam power plant practice.

**Railway Problems**

Some Graphical Solutions of Electric Railway Problems (74587 N). A. M. Buck. 30 pp. Univ Ill, Bul—July 24, 1916.

**Rapid Transit**

Rapid Transit Railways—Some Features of Construction and Cost (78502). Ernest V. Pannell. Read before Toronto Sec. of A. I. E. E. Ills. 2500 w. Can Engr—May 3, 1917. Comparisons between subways, elevated roads and underwater tubes.

A Suggested Legislative Program Preliminary to Rapid Transit Development in St. Louis (81232 A). Winters Haydock. 16 pp. E Cb St L, Jl—July-Aug., 1917. A study of the financial and legislative history of rapid transit development, applied to the St. Louis traffic situation.

**Rates**

Movement for Increased Revenues (79831 A). 24 pp. A E R A—June, 1917. What is being done to secure needed financial relief.

**Reconstruction**

Old Cars Remodeled at Portland, Me. (76123). Ills. 1500 w. Elec Ry Jl—Jan. 20, 1917. Reconstructed for prepayment.

**Regenerative Control**

Regenerative Electric Braking (74253 A). J. J. Linebaugh. Ills. 2500 w. Gen Elec Rev—Nov., 1916. Difficulties in designing regenerative control apparatus for the standard d. c. series railway motor, and the advantages.

**Reorganization**

London County Council Tramways Reorganization (78038 A). 12800 w. Tmwy & Ry Wld—March 15, 1917. Full text of the Highway Committee report which was unanimously adopted.

**Safety Code**

The National Electrical Safety Code from the Electric Railway Standpoint (81108). E. B. Rosa and W. J. Canada. 3500 w. Elec Ry Jl—Sept. 15, 1917. Serial, 1st part. Synopsis of code prepared for convenience of electric railway executives.

**Salesmanship**

Salesmanship for Electric Railways (77323 A). Robert Frothingham. 7 pp. A R E A Bul—Feb., 1917. Selling jobs to men and service to the public.

**Schedules**

Determining the "Slack" in a Schedule (79259). C. H. Koehler. 2000 w. Elec Ry Jl—June 16, 1917. Gives a novel "service characteristic" diagram.

**Service**

Public's Share in Providing Good Service (76584 A). Bion J. Arnold. 2500 w. A E R A—Jan., 1917. Fundamentals of efficient routing.

Satisfactory Service and Sound Securities (81534 A). M. C. Brush. 3500 w. A E R A—Sept., 1917. Need of returning to trustees the management of railway property and confining public service commissions to supervision and regulation.

Six Fundamentals of Regulation (81533 A). Bentley W. Warren. 3500 w. A E R A—Sept., 1917. What must be done to enable electric railways to give satisfactory service.

**Service Cost**

How the Costs of Rendering Service Are Steadily Going Up (79394). Ivy L. Lee. 2200 w. Elec Ry Jl—June 23, 1917. Serial, 1st part. Statistics showing marked increase.

**Shops**

De hoofdremise Tollensstraat en de centrale werkplaatsen der Gemeentetram van Amsterdam (76224 B). T. E. Van Putten. Ills. 3300 w. Ingr—Dec. 23, 1916. Main repair shops of the Amsterdam municipal tramways.

West Penn Shops and Shop Methods (78171). Daniel Duree. Ills. 2000 w. Elec Ry Jl—April 21, 1917. Details that add to the efficiency of the Collinsville shops.

**Signals**

New York Elevated Signal Improvements (81645). Charles McGregor. Ills.

2000 w. Ry Sig Engr—Oct., 1917. Reconstructed Rector St. electro-pneumatic plant on 9th Ave. line.

**Springfield**

Purchased Power for Springfield (Mass.) Street Railway (81013). Ills. 2500 w. Elec Ry Jl—Sept. 8, 1917. Outlines arrangements for operating system by hydroelectric and auxiliary steam plants.

**Standards**

The Value of Standards to the Railway Industry (77399). A. L. Broomall. 2500 w. Elec Ry Jl—March 17, 1917. Abstract of paper before Cent Elec Ry Assn. Outlines advantages.

**Stations**

"South Station Under" of Boston Rapid-Transit System Has Ample Traffic Facilities (75692). William W. Lewis. Ills. 1800 w. Eng Rec—Dec. 30, 1916. Details of arrangements.

Would Redesign Times Square Station for New York's Enlarged Transit System (77630). Ills. 3000 w. Eng Rec—March 24, 1917. Proposed plan, recognizing changed conditions.

**Stops**

Railway Stops (80596). John A. Beeler. 3000 w. Elec Ry Jl—Aug. 18, 1917. Analyzes the effect of stop frequency on schedules and on walking distances and time savings for patrons.

**Storage Yards**

Cutting Costs in Storage Yards (75483). R. C. Cram. Ills. 1800 w. Elec Ry Jl—Dec. 23, 1916.

Layout and Equipment of Storage Yard for Handling Large Quantities of Way Materials (76877). Ills. 2000 w. Elec Ry Jl—Feb. 24, 1917. Cleveland, O.

**Stores Department**

The Handling of Supplies (75279 A). F. W. Stevens. 1500 w. A E R A—Nov., 1916. Elements that prevent overstocking.

**Substations**

Give the Operator a Job (74263 A). Cassius M. Davis. Ills. 3000 w. Gen Elec Rev—Nov., 1916. Shows how economies can be secured in electric railway operation by the use of automatic substations.

Substations of the Chicago, Milwaukee & St. Paul Railway Electrification (74254 A). A. Smith. Ills. 1500 w. Gen Elec Rev—Nov., 1916. General arrangement of buildings and apparatus.

1500-Volt Substation With Three 750-Volt Rotaries (75042). M. R. Lott. Ills. 1500 w. Elec Ry Jl—Dec. 2, 1916. Bringhurst substation of Salt Lake & Utah R. R.

First Automatic 1200-Volt Substation (79907). Ills. 3000 w. Elec Ry Jl—July 14, 1917. Equipment of a Milwaukee interurban line substation.

Reduction of Railway Operating Costs by Use of Automatic Substations (81109). W. D. Bearce. Ills. 1500 w. Elec Ry Jl—Sept. 15, 1917. Labor saving and other sources of economy.

**Subways**

Travia sotterranea per Roma (76905 C). R. Cametti. Ills. 1800 w. Soc Ing Arch Ital—Jan. 1, 1917. Plan for a system of subways for the city of Rome.

Le Comunicazioni Urbane Sotterrance (80712 C). M. Piacentini. 2700 w. Soc Ing Arch Ital—July 16, 1917. Advantages of subways in cities. Application to Rome, Vienna and other cities.

**Sydney**

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